



UNIVERSITI
TEKNOLOGI
MARA

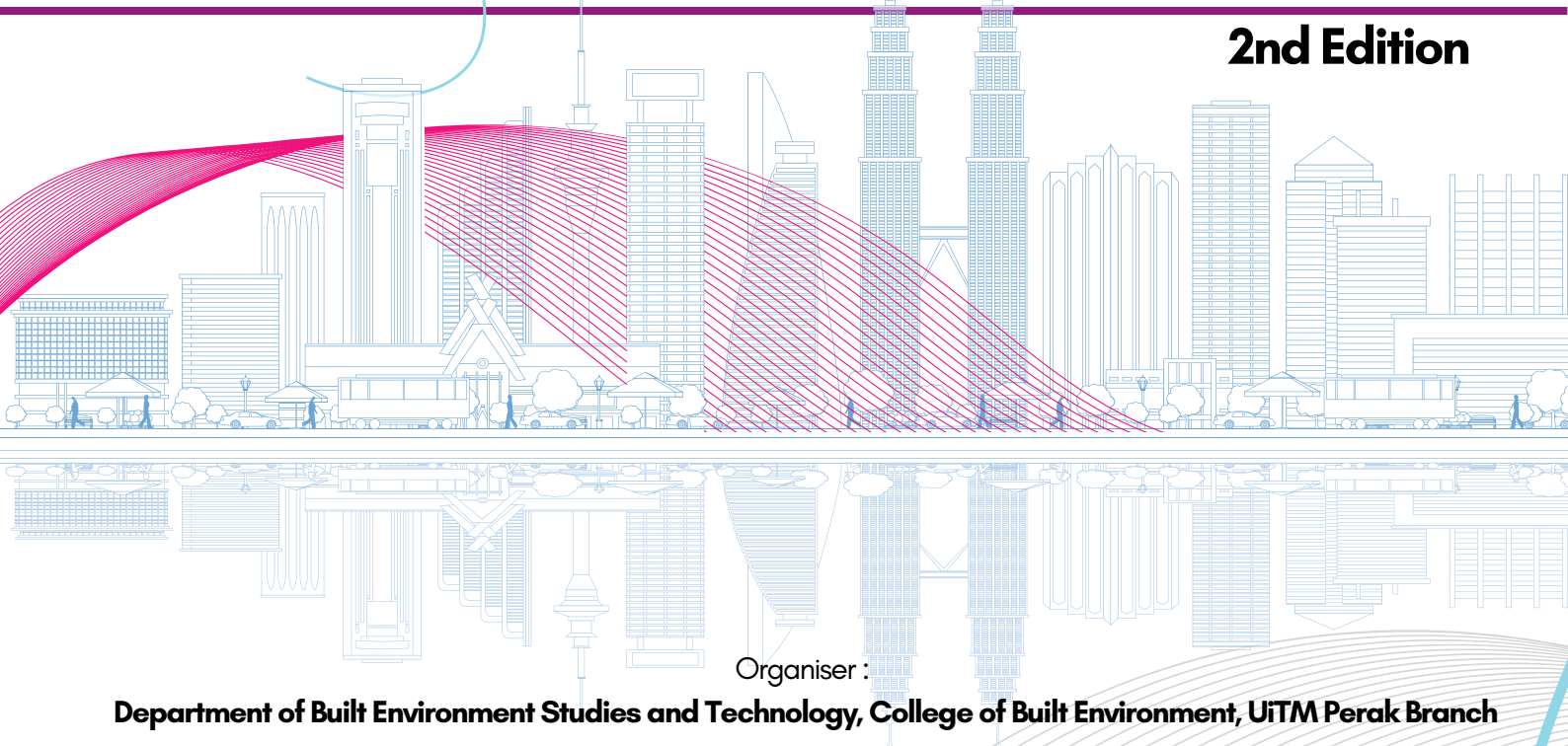
Cawangan Perak

e - Proceedings



Proceeding for International Undergraduates Get Together 2024 (IUGeT 2024)
“Undergraduates’ Digital Engagement Towards Global Ingenuity”

2nd Edition



Organiser :

Department of Built Environment Studies and Technology, College of Built Environment, UiTM Perak Branch

Co-organiser :

INSPIRED 2024. Office of Research, Industrial Linkages, Community & Alumni (PJIMA), UiTM Perak Branch

Bauchemic (Malaysia) Sdn Bhd

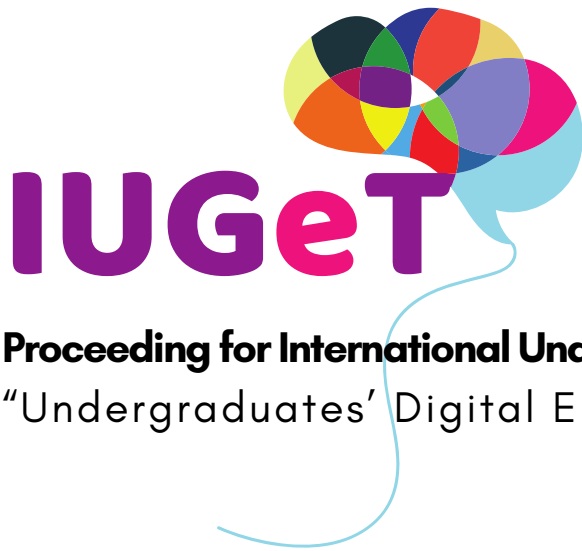
Universitas Sebelas Maret

Universitas Tridianti (UNANTI)

Publication date :

November 2024

e - Proceedings



Proceeding for International Undergraduates Get Together 2024 (IUGeT 2024)
“Undergraduates’ Digital Engagement Towards Global Ingenuity”

Organiser :

Department of Built Environment Studies and Technology, College of Built Environment, UiTM Perak Branch

Co-organiser :

INSPIRED 2024. Office of Research, Industrial Linkages, Community & Alumni (PJIMA), UiTM Perak Branch

Bauchemic (Malaysia) Sdn Bhd

Universitas Sebelas Maret

Universitas Tridinanti (UNANTI)

© Unit Penerbitan UiTM Perak, 2024

All rights reserved. No part of this publication may be reproduced, copied, stored in any retrieval system or transmitted in any form or by any means; electronic, mechanical, photocopying, recording or otherwise; without permission on writing from the director of Unit Penerbitan UiTM Perak, Universiti Teknologi MARA, Perak Branch, 32610 Seri Iskandar Perak, Malaysia.

Perpustakaan Negara Malaysia

Cataloguing in Publication Data

No e- ISBN: 978-967-2776-42-0

Cover Design: Muhammad Anas Othman

Typesetting : Arial

iVUTI 2024 Committee

Project Leader

Ts Muhammad Naim Mahyuddin

Assistant Project Leader 1

Dr Ezzat Fahmi Ahmad

Assistant Project Leader 2

En Mohd Fadzli Mustaffa

Secretariat 1

Syahmimi Ayuni Ramli

Secretariat 2

Nur Afiqah Anuar

Treasurer

Dr Izrahayu Che Hashim

Registration Team

Dr Asmaa' Che Kassim

Dr Fatin Syazwina Abdul Shukor

Dr Suwaibatul Islamiah Abdullah Sani

Certification Team

Ts Nurul Huda Abdul Hadi

Ir Raja Nurulhaiza Raja Nhari

Dr Siti Jamiah Tun Jamil

Graphic Team

Mohammad Fitry Md Wadzir

Jannatun Naemah Ismam,

Nor Azizah Talkis

Wan Nur Hanani Wan Abdullah

Promotion Team

Nurulanis Ahmad@Mohamed

Najma Azman

Ts Sr Dr Asmat Ismail

Evaluation Team

Dr Suzanah Abdullah

Haslina Hashim

Azlizan Adila Mohamad

Noorsazwan Ahmad Pugi

Gs Dr Munirah Radin Mohd Mohktar

Mohd Najib Husain

Publication Team

Nur'Ain Ismail (Head)

Siti Nurhayati Hussin (Chief)

Dr Nuramira Anuar (Sub-chief)

Dr Paul Gnanaselvam A/L Pakirathan

Noorlinda Alang

Norasyikin Abdul Malik

Halimatussaadia Iksan

Nurdiyana Mohamad Yusof

Syaza Kamarudin

Dr Wan Nordiana Wan Ali

Dr Ida Nianti Mohd Zin

Dr Nurul Sahida Fauzi

Dr Noor Rizallinda Mohd Ishak

Dr Lizawati Abdullah

Iza Faradiba Mohd Patel

Nurfatima Wahida Nasir

Nazirul Mubin Mohd Noor

WHEELWISE FOR CONSTRUCTION SITE USE

Harith Danial*, Aniq Fadhli, Mohammad Zulhairi, Wan Muhammad Hafiz, and Muhammad Zuhair

Department of Built Environment Studies and Technology, College of Built Environment,
Universiti Teknologi MARA Perak Branch, Seri Iskandar Campus, 32610 Seri Iskandar,
Perak, MALAYSIA

*danialharith103@gmail.com

Abstract

The construction and landscaping industries often require manual transportation of heavy materials, which is physically demanding and time-consuming. There is a growing need for equipment that eases the burden on workers and improves efficiency. Traditional wheelbarrows demand significant physical effort to maneuver, especially on uneven terrain with heavy loads, leading to worker fatigue, reduced productivity, and potential injuries. A more efficient and less labor-intensive solution is necessary for material transport. This invention aims to develop a motorized wheelbarrow that reduces physical strain on workers and enhances productivity. Key goals include decreasing the effort needed to transport heavy materials, increasing transport speed and efficiency, and enhancing worker safety. The motorized wheelbarrow features a battery-powered electric motor, robust all-terrain wheels, and a user-friendly control system. Its ergonomic design ensures ease of use. Field tests compared the motorized wheelbarrow's performance with traditional ones in various scenarios. Results show that the motorized wheelbarrow significantly reduces the physical effort required, cutting transport time by up to 50% compared to traditional wheelbarrows. Workers reported less fatigue and increased productivity. The motorized wheelbarrow also improved stability and safety on uneven terrain. Offering a practical solution to challenges in construction and landscaping, the motorized wheelbarrow reduces physical strain and boosts efficiency, leading to higher productivity and fewer injuries. Its potential to transform material transport in labor-intensive industries gives it considerable commercial appeal.

Keywords: Wheelwise, Wheelbarrow, Motorized wheelbarrow, Construction

1. INTRODUCTION

In the realm of construction, efficiency and precision are paramount. As projects become more complex and timelines tighten, the tools we use must evolve to meet these new demands. Enter our innovative construction trolley project—an advancement designed to redefine how materials and equipment are managed on-site. Traditionally, trolleys in construction have been instrumental in moving materials from one point to another, but they have often struggled with limitations in adaptability, efficiency, and integration with modern technology. Our project introduces a state-of-the-art trolley system that combines innovative technology with robust design to address these very challenges. This new trolley system is engineered to enhance productivity and streamline operations on construction sites. It features an improvement in traditional trolley that has been used in construction for many years. With its adaptive load management system, it can oversee a diverse range of materials, from heavy equipment to delicate components safely and efficiently. Real-time tracking and integration with digital project management tools ensure that every move is optimized and logged, providing valuable insights, and improving overall site management.

By focusing on both technological advancement and practical usability, our innovative trolley project is set to revolutionize material handling in construction. It promises not only to increase operational efficiency but also to contribute to a safer and more organized work environment.

2. MATERIALS AND METHODS

In contemporary context, a wheelbarrow continues to be a vital tool across various industries, including construction, landscaping, and agriculture. Modern advancements in design, materials, and ergonomics have enhanced its functionality and efficiency. This review explores recent literature on the wheelbarrow, highlighting technological innovations, ergonomic improvements, and current applications.

The wheelbarrow remains indispensable in various fields. In construction, modern wheelbarrows are designed to manage diverse materials, from concrete to debris. Research by Thompson and Nguyen (2024) indicates that advancements such as reinforced steel frames and high-capacity tires have improved the wheelbarrow's ability to withstand heavy loads and rough conditions on construction sites.

In landscaping and gardening, wheelbarrows with specialized features, such as large-capacity bins and multifunctional designs, are increasingly popular. According to Jones et al. (2022), these designs cater to specific needs such as bulk soil transport and easy dumping, enhancing efficiency in landscaping tasks.

The wheelbarrow has evolved significantly in recent years, incorporating technological, ergonomic, and environmental advancements. Modern designs emphasize durability, user comfort, and efficiency across various applications. As technology progresses and sustainability becomes more central to product development, future innovations in wheelbarrow design will continue to enhance its functionality and environmental footprint.

3. RESULTS AND DISCUSSION

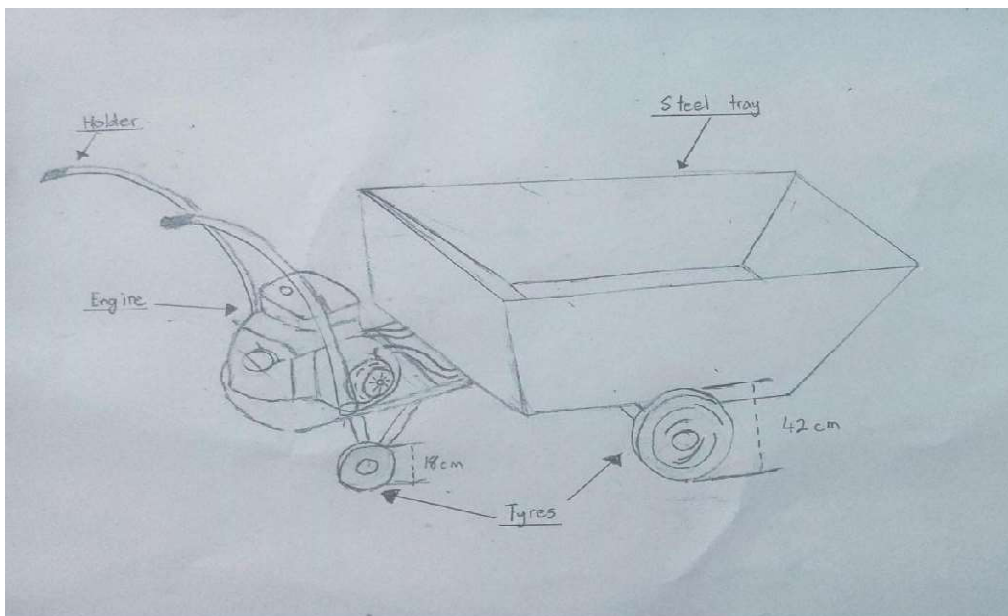


Figure 1: Wheelwise (motorized wheelbarrow)

The motorized wheelbarrow typically has a set of handlebars or controls that allow the user to steer and manage the speed of the wheelbarrow. The controls are designed to be user-friendly, making it easier to navigate and maneuver. Therefore, it can easily control big items.

The function of a motorized wheelbarrow is to assist in transporting heavy or bulky loads with minimal physical effort from the user. It combines the basic concept of a traditional wheelbarrow with motorized propulsion to enhance efficiency and ease of use. Motorized wheelbarrows equipped with robust wheels and sometimes track systems designed to manage diverse types of terrain. This ensures stability and smooth operation on surfaces like gravel, dirt, or rough ground. The motor assists in carrying heavier loads than a manual wheelbarrow, which might be limited by the user's strength. This is particularly useful for moving massive quantities of materials such as soil, mulch, concrete, or construction debris. The motor (either gas-powered or electric) drives the wheelbarrow. This propulsion helps to move the wheelbarrow forward or backward, reducing the need for manual pushing or pulling. The motorized system provides the necessary power to transport these materials from one location to another, even over uneven or rough terrain.

On the other hand, some models come with features like variable speed controls, different modes for diverse types of loads, and additional attachments or accessories for specific tasks. Lastly, the motorized wheelbarrow simplifies material handling, increases productivity, and is particularly beneficial in demanding environments where manual wheelbarrows might be insufficient or too strenuous to use.

4. CONCLUSION

The project involves the innovation of a traditional wheelbarrow modified with an engine and additional wheels that highlights significant potential for improvement in efficiency and performance. By incorporating the engine into the design, the wheelbarrow can facilitate transportation of heavy loads, reducing manual effort and speeding up the work process. The engine makes the wheelbarrow more efficient, allowing for faster and less strenuous movement of materials. Additionally, the inclusion of extra wheels provides enhanced stability, especially on uneven surfaces, which helps minimize the risk of damage to cargo and accidents to users. However, this innovation also presents challenges, such as increased production and maintenance costs that need to be considered. The added costs for the engine and wheels, as well as the need for user training and maintenance systems, are important aspects to manage. Furthermore, safety considerations, including ensuring the engine and braking systems function correctly, must be addressed. Overall, this project has the potential to enhance the performance and functionality of traditional wheelbarrows, but further research and testing are needed to ensure it operates safely and effectively across various conditions.

5. ACKNOWLEDGMENT

First, we would like to express our sincere gratitude to my lecturer Miss Nur Afifah for all the help, support, and encouragement during completing this project. The direction of this work has been influenced by her knowledge and constructive criticism.

We also would like to acknowledge the support of our colleagues and friends who have provided encouragement and assistance throughout this journey. Their camaraderie and moral support were immensely appreciated.

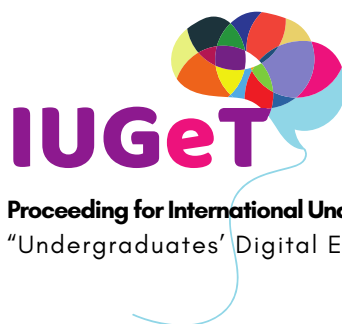
Finally, we are deeply indebted to our families for their unwavering love, understanding, and encouragement. Their constant support has been the driving force behind our endeavors. This project would not have been possible without the collective efforts of all those mentioned above, and for that, we are grateful. Thank you.

6. REFERENCES

- Adams, R., Lee, J., & Brooks, T. (2020). *Self-Leveling Wheelbarrows: Enhancing Stability and User Experience*. *Ergonomic Design Journal*, 31(4), 122-134.
- Green, T., & Turner, P. (2023). *Sustainable Materials and Practices in Modern Wheelbarrow Production*. *Environmental Engineering Review*, 39(2), 45-59.
- Jones, L., Thompson, H., & Carter, M. (2022). *Advanced Wheelbarrow Designs for Landscaping and Gardening*. *Journal of Horticultural Tools*, 28(1), 77-89.
- Kline, S., & Johnson, M. (2023). *Electric Wheelbarrows: Reducing Manual Labor with Modern Technology*. *Journal of Construction Technology*, 42(3), 89-104.
- Patel, R., Singh, A., & Wilson, P. (2023). *Ergonomic and Durable Features in Contemporary Agricultural Wheelbarrows*. *Agricultural Tools Review*, 34(1), 56-72.
- Patel, R., Lewis, J., & Martin, L. (2022). *Composite Materials in Modern Wheelbarrow Design*. *Materials Science and Engineering Journal*, 37(3), 233-245.
- Smith, A., & Lewis, H. (2021). *Ergonomic Enhancements in Wheelbarrow Design: A Comprehensive Review*. *Journal of Ergonomics and User Experience*, 40(2), 115-130.
- Thompson, J., & Nguyen, T. (2024). *Wheelbarrows in Construction: Advances and Applications*. *Construction Engineering Review*, 35(4), 67-80.



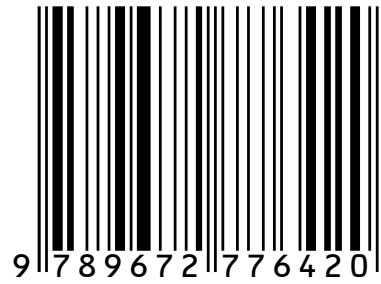
Cawangan Perak **e - Proceedings**



Proceeding for International Undergraduates Get Together 2024 (IUGeT 2024)
"Undergraduates' Digital Engagement Towards Global Ingenuity"

e-Proceeding IUGeT 2024 2nd Edition

e ISBN 978-967-2776-42-0



Unit Penerbitan UiTM Perak

(online)