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**JOHOR  
INNOVATION  
INVENTION  
COMPETITION  
AND  
SYMPOSIUM  
2023**



"Innovation Inspires a Society  
to be Critical and Creative"

# **JOHOR INNOVATION INVENTION COMPETITION AND SYMPOSIUM 2023**



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Critical and Creative"

**Editors-in-Chief**

**AHMAD KHUDZAIRI KHALID  
NUR INTAN SYAFINAZ AHMAD**



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Kampus Pasir Gudang**

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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.**



## DESIGN AND FABRICATION OF A SELF-BALANCING DEVICE FOR FOOD DELIVERY

Nur Kamarliah Kamardin<sup>1\*</sup>, Alif Darwisy Bin Mohd Fauzi<sup>2</sup>, Ahmad Najmie Bin Rusli<sup>2</sup>, Ahmad Idzwan Bin Yusuf<sup>3</sup>, Ros Atiqah Binti Abdul Kadir @ Che Ismail<sup>4</sup>, Ana Syahidah Binti Mohd Rodzi<sup>1</sup>

<sup>1</sup>School of Mechanical Engineering, UiTM Cawangan Pulau Pinang Kampus Permatang Pauh

<sup>2</sup>School of Mechanical Engineering, UiTM Cawangan Johor Kampus Pasir Gudang

<sup>3</sup>School of Civil Engineering, UiTM Cawangan Johor Kampus Pasir Gudang

<sup>4</sup>School of Mechanical Engineering, UiTM Cawangan Terengganu Kampus Bukit Besi

Corresponding author: nurkamarliah@uitm.edu.my (Nur Kamarliah Kamardin)

### ABSTRACT

The self-balancing device for food delivery is designed to secure food and beverages inside the delivery bags, minimizing spills and damage during rushed or winding road deliveries. Maintaining the food in perfect condition after delivery significantly enhances the customer experience. Existing food delivery literature has explored solutions like a bag carrier mounted at the back of motorcycles or worn like a backpack by the rider. However, such setups rely on motorcycle swerving, leading to potential spills and damage, especially on busy or winding routes. Moreover, this approach jeopardizes rider safety as they must balance swift delivery with keeping the food intact, potentially leading to accidents due to divided attention. This project's main objectives are twofold: first, to design an efficient self-balancing device for food delivery, and second, to analyse the mechanical systems involved in its implementation. By achieving these goals, the project aims to reduce the risk of accidents for riders while ensuring the food reaches customers in perfect condition. This project seeks to revolutionize food delivery by introducing a self-balancing device to maintain food stability during transportation.

**Keywords:** Self-balancing devices, food beverages

### 1.0 INTRODUCTION

Food delivery has started to become common in the past two and three years due to the pandemic Covid-19. This is also influenced by the increasing of food delivery services in Malaysia which created many job opportunities for the community such as food delivery riders. The food delivery riders are the ones who are responsible for delivering food to customers who request a food delivery through the food delivery application. Maintaining the food in perfect condition after delivery significantly enhances the customer experience. Existing food delivery literature has explored solutions like a bag carrier mounted at the back of motorcycles or worn like a backpack by the rider. However, such setups rely on motorcycle swerving, leading to potential spills and damage, especially on busy or winding routes. Moreover, this approach jeopardizes rider safety as they must balance swift delivery with keeping the food intact, potentially leading to accidents due to divided attention. Therefore, this project aims to design an efficient self-balancing device for food delivery and to analyse the mechanical systems involved in its implementation. The self-balancing device for food delivery is designed to secure food and beverages inside the delivery bags, minimizing spills and damage during

rushed or winding road deliveries. This device also might potentially reduce the risk of accidents for riders while ensuring the food reaches customers in perfect condition.

## 2.0 OBJECTIVE

The goal of this project is to create a self-balancing device for food delivery to keep food safe during fast or bumpy deliveries. Thus, the objectives of this project is to design an efficient self-balancing device and analyze its mechanical systems.

## 3.0 DESCRIPTION OF INNOVATION/METHODOLOGY

Figure 1 shows the product of the self-balancing device. The steps to use the self-balancing device are as follows:-

1. Place the device at the back of a motorcycle by bolting it on and making sure it is anchored properly as shown in Figure 2.
2. The food delivery bag is then tied onto the platform by using paracords or elastic ropes as shown.
3. Test whether the device is working properly by swinging the platform gently as shown in Figure 3.
4. Position the food on top of the swinging device and cover it with the delivery bag, making it ready for the delivery process.

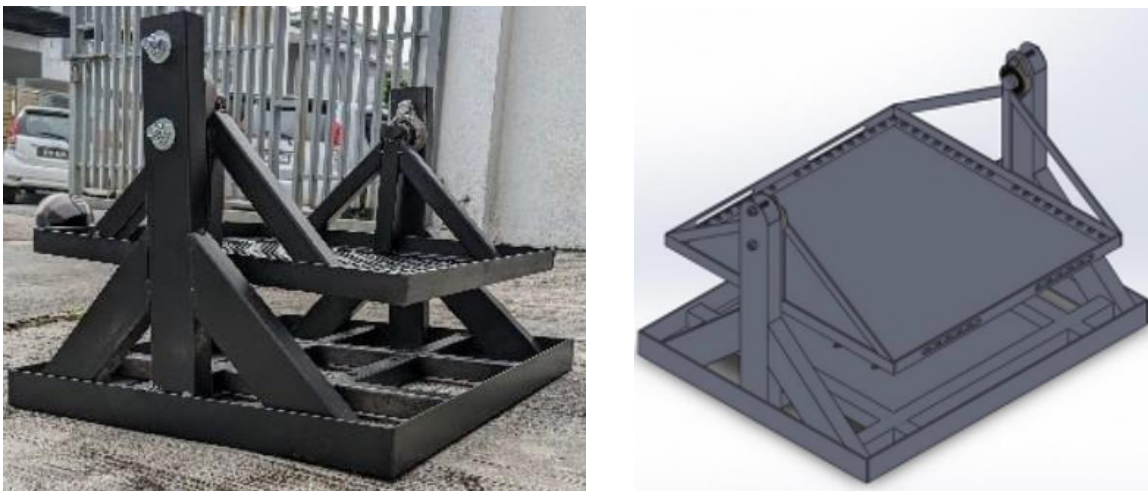


Figure 1: Product of Self-Balancing Device

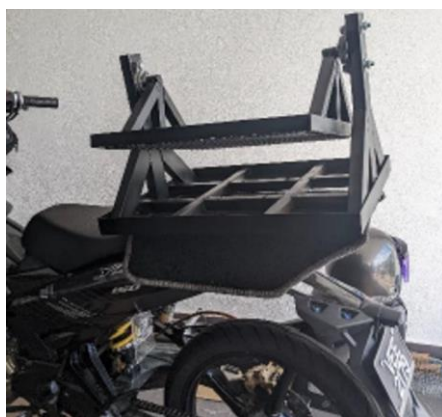


Figure 2: Self- Balancing Device Placed at The Back of Motorcycle



Figure 3: Test the Self- Balancing Device

#### **4.0 ADVANTAGE/IMPACT/RESULTS/NOVELTY**

This device can be beneficial to food delivery riders by providing reliable, efficient food delivery and reducing accidents. The impact of this product is expected to transform the food delivery industry by increasing customer satisfaction by preventing food spillage during delivery.

#### **5.0 CONCLUSION**

The project successfully created a food-balancing device to prevent food spillage during delivery and makes food deliveries more reliable and efficient. This device greatly improves the food delivery experience for customers and delivery partners.