

PROTOTYPE DESIGN COLLECTION

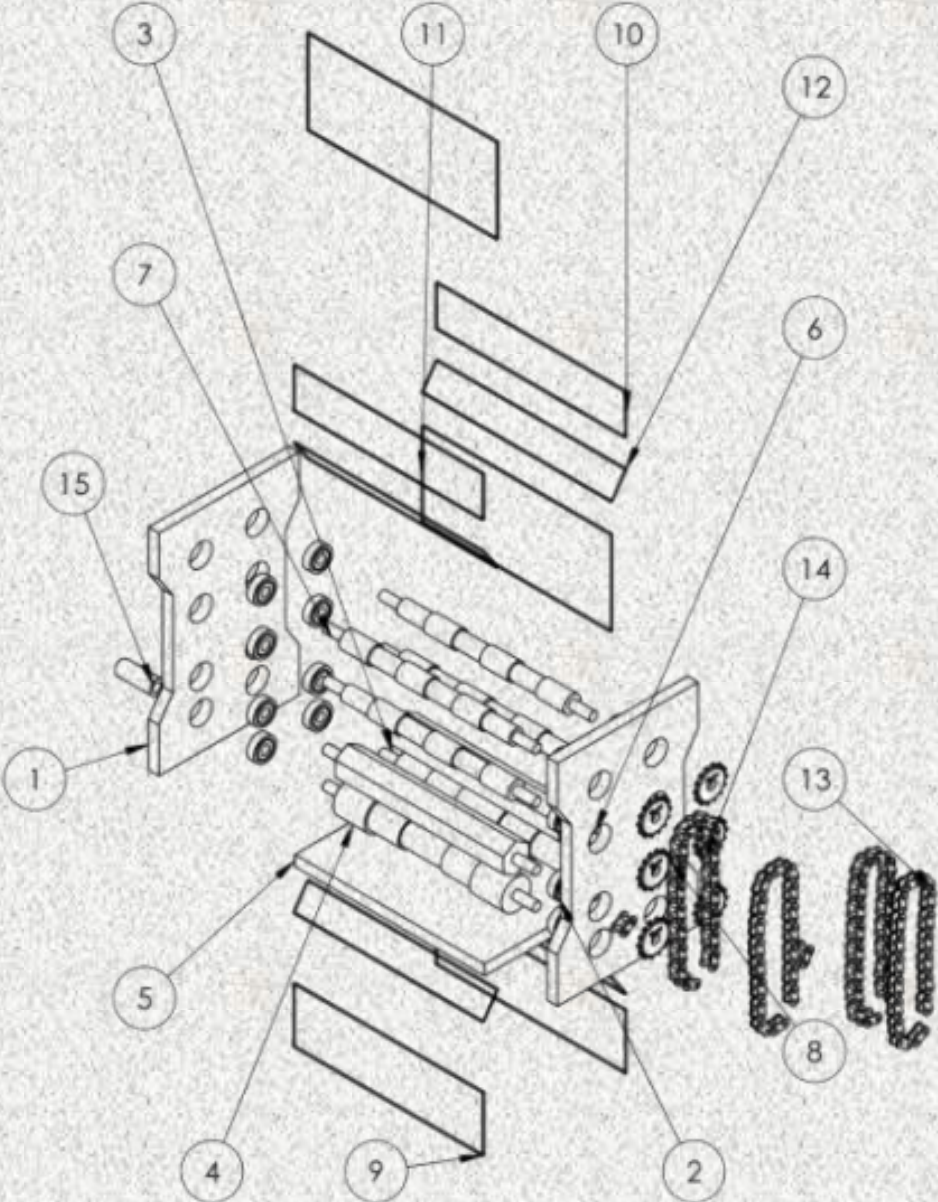
SERIES 4



Universiti Teknologi MARA
Pasir Gudang Campus

Prototype Design Collection

Series 4



Ahmad Najmie Rusli

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FOREWORD

This digital book on Prototype Design Collection Series 4 (PDC Series 4) is published as a reference design for mechanical engineering students. The designs presented experience a few phases of analysis before fabrication of prototype. Each project summarises the project description, prototype, figures, and design parameter. The design products vary in tools or equipment for household, workshop, entrepreneur, etc. Suggested material and detail of prototype dimension are also mentioned in this book.

It is hoped that this book will assist the students to have more ideas on innovation design products in the future.

Table of Contents

CHAPTER 1	1
Design and Fabrication of a Multipurpose Baby Cot	1
Nabil Qayyum Bin Roslan ¹ and Miqdad Bin Khairulmaini ^{2*}	1
CHAPTER 2	3
Design and Fabrication of a Weather Sensing Cloth Drying Rack	3
Mustaqim Syah Bin Kamarul Zaman ¹ and Miqdad Bin Khairulmaini ^{2*}	3
CHAPTER 3	5
Design and Fabrication of a Patient Transfer Aid for Seamless Bed to Wheelchair Mobility ..	5
Fateen Aqela Binti Azzaidi ¹ and Miqdad Bin Khairulmaini ^{2*}	5
CHAPTER 4	7
Prototype of a Donut Topping Machine	7
Nurul Athirah Binti Ramizan Nassir ¹ and Ahmad Najmie Rusli ^{2*}	7
CHAPTER 5	9
Prototype of a PLA Filament Extruder	9
Abdul Harith Hazim Bin Abd Rashid ¹ and Ahmad Najmie Rusli ^{2*}	9
CHAPTER 6	11
Prototype of a Candy Sorting Machine	11
Hairul Ikhwan Bin Hazizan ¹ and Ahmad Najmie Rusli ^{2*}	11
CHAPTER 7	13
Prototype of a 3D Printing Scrap Recycling Machine	13
Raziq Amir Bin Rosdi ¹ and Ahmad Najmie Rusli ^{2*}	13
CHAPTER 8	15
Manual Compaction Machine for Casting	15
Muhammad Hazim Md Azli ¹ , Najibah Ab Latif ^{2*} and Ainaa Maya Munira Ismail ³	15
CHAPTER 9	17
Convertible Cart-Ladder	17
Mohamad Aimi Zuhairi Fikri Mohd Aimi Zamani ¹ , Najibah Ab Latif ^{2*} and Ainaa Maya Munira Ismail ³	17
CHAPTER 10	19
Design and Fabrication of Mini Firefighting Device	19
Adam Faris Bin Ahmad Zaidy ¹ and Muhamad Faris Syafiq Bin Khalid ^{2*}	19
CHAPTER 11	21
Design and Fabrication of Shuttlecock Launcher Machine	21

CHAPTER 35

Design and Fabrication of a Helmet Washing Machine

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PROJECT DESCRIPTION

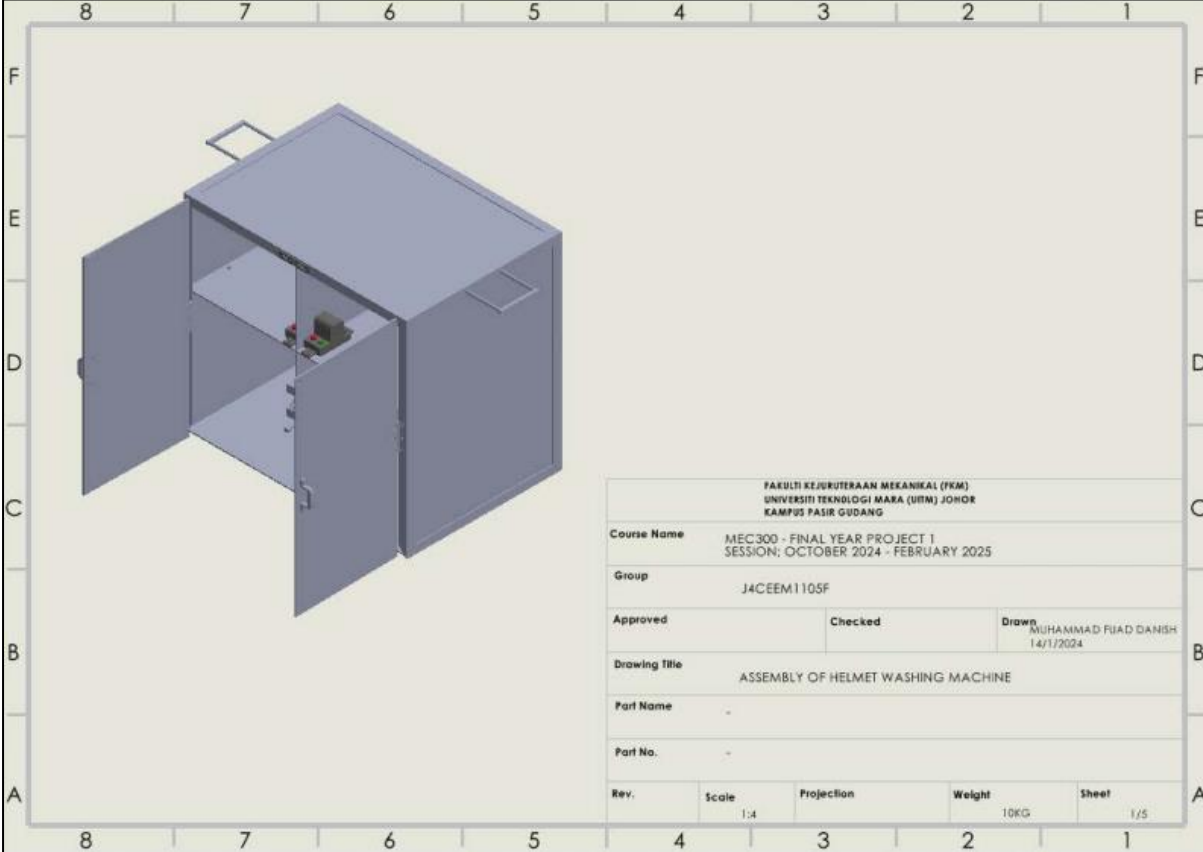
Motorcycle helmets are essential for rider safety, but their inner linings accumulate sweat, dirt, and bacteria over time, leading to hygiene issues and unpleasant odors. Traditional cleaning methods are often time-consuming and ineffective in reaching hidden crevices. This study focuses on the design and fabrication of an automated helmet washing machine to simplify the cleaning process. The machine incorporates a rotating nylon brush for scrubbing, a controlled water spraying system for rinsing, and a PTC air heater for drying. The design was developed using SolidWorks, followed by material selection and prototype fabrication. Mild steel was used for the structural frame, while aluminum composite panels were chosen for their durability and corrosion resistance. Structural integrity was evaluated using stress analysis in SolidWorks, and theoretical calculations were performed to determine the torque requirements for the rotating brush mechanism. The project successfully demonstrates the feasibility of a cost-effective and user-friendly helmet washing machine. While the prototype operates as intended, further testing is required to assess cleaning efficiency, drying performance, and long-term durability. Future improvements include optimizing water usage, enhancing the drying mechanism, and integrating an automated timer for improved user convenience.

Keywords: *Helmet washing machine, automated cleaning*

PROTOTYPE



DESIGN PARAMETER



The image shows a 3D CAD model of a helmet washing machine assembly. The model is a rectangular cabinet with two doors open, revealing internal components. The drawing is framed by a grid with horizontal labels A-F and vertical labels 1-8. To the right of the model is a title block containing the following information:

FAKULTI KEJURUTERAAN MEKANIKAL (FKM) UNIVERSITI TEKNOLOGI MARA (UTM) JOHOR KAMPUS PASIR GUDANG				
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Group		J4CEEM1105F		
Approved	Checked	Drawn MUHAMMAD RIJAD DAMIR 14/1/2024		
Drawing Title ASSEMBLY OF HELMET WASHING MACHINE				
Part Name -				
Part No. -				
Rev.	Scale	Projection	Weight	Sheet
	1:4		10KG	1/5