

PROTOTYPE DESIGN COLLECTION

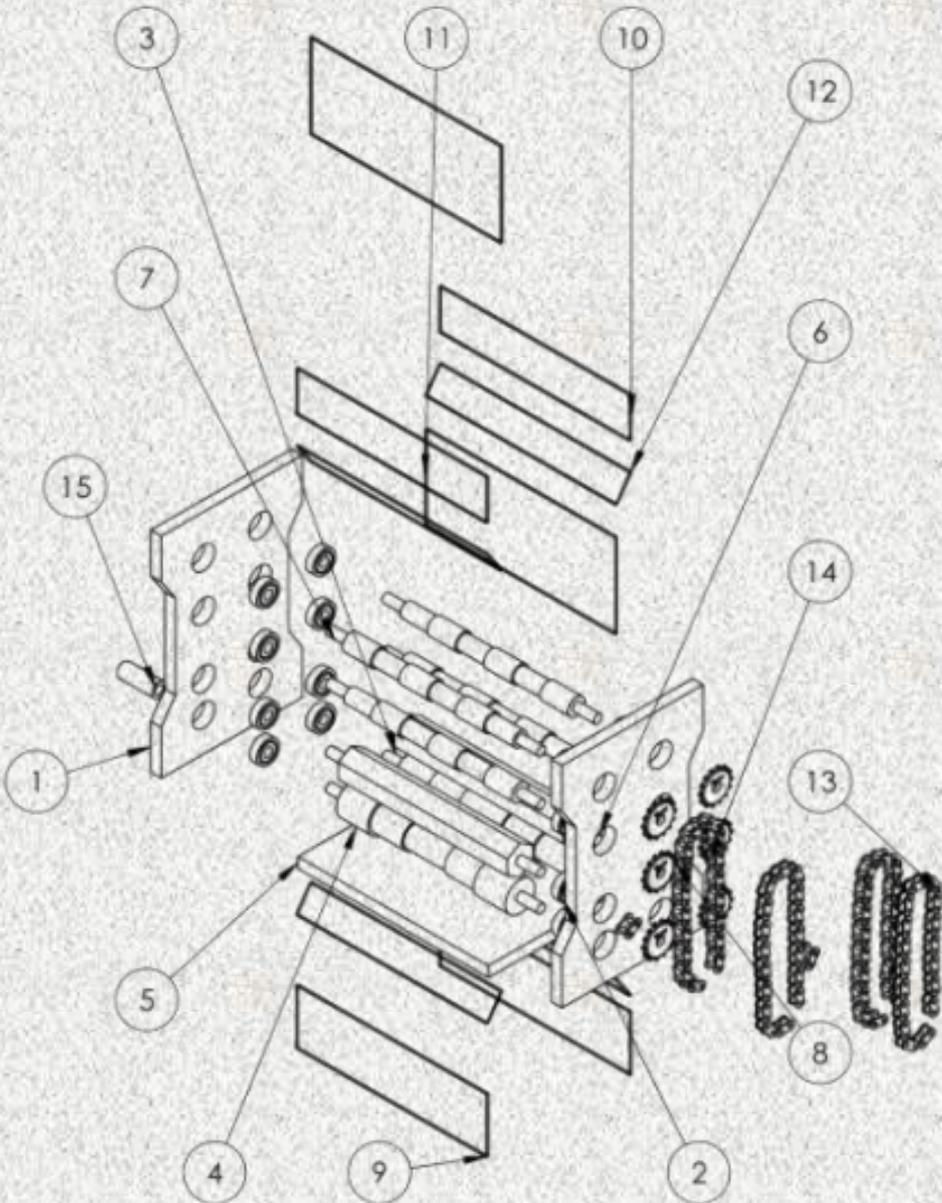
SERIES 4



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.

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CHAPTER 10

Design and Fabrication of Mini Firefighting Device

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PROJECT DESCRIPTION

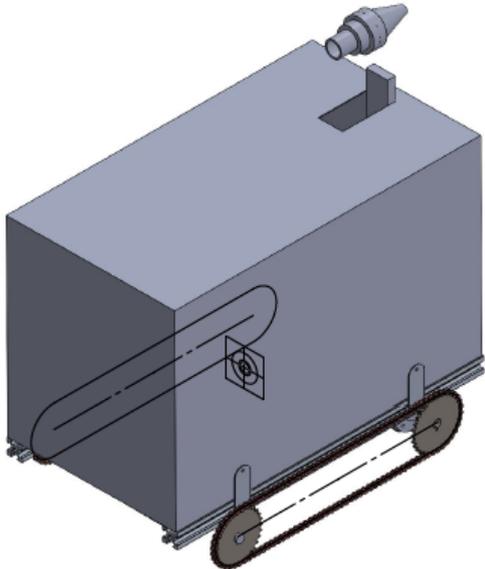
Firefighting remains one of the most hazardous occupations, with personnel frequently required to navigate confined and unstable environments. In such conditions, limited manoeuvrability and delayed response times can result in severe injuries or fatalities. This project presents the design and development of a compact, automated firefighting device intended to address the limitations of existing market solutions, which are often oversized, irregularly shaped, and cumbersome to deploy in restricted spaces. The proposed device features a streamlined form factor optimised for navigating narrow gaps within collapsed structures. An integrated flame sensor enables autonomous water discharge, eliminating the need for manual activation and reducing critical response time. Components are selected based on cost-effectiveness, availability, and ease of maintenance to ensure practicality in large-scale deployment. The design is modelled in SolidWorks 2021 and manufactured using appropriate techniques, with emphasis on minimising weight and enhancing portability. Fabrication involves three primary mechanical processes: bending, joining, and cutting. Control is managed by an Arduino-based system, which aims to reduce operational errors under high-stress emergency conditions. The anticipated outcome is a lightweight, agile, and user-friendly firefighting device capable of operating effectively in confined environments while supporting faster, safer intervention. By combining compact mechanical design, autonomous sensing, and low-cost production, this project seeks to advance firefighting technology, improving both efficiency and safety in critical rescue operations.

Keywords: *Firefighting, Automation*

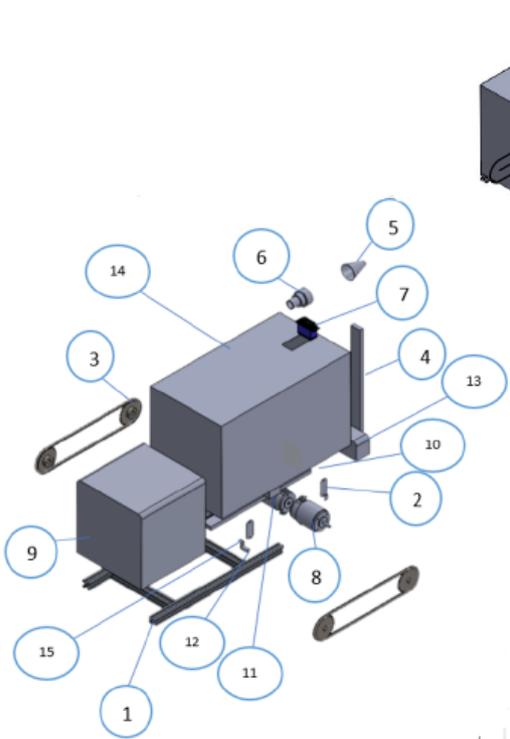
PROTOTYPE



DESIGN PARAMETER



FAKULTI KEJURUTERAAN MEKANIKAL (FKM) UNIVERSITI TEKNOLOGI MARA (UiTM) JOHOR KAMPUS PASIR GUDANG				
Course Name MEC299 - FINAL YEAR PROJECT 1 SESSION: MARCH 2024 - AUGUST 2024				
Group J4CEEM1104B				
Approved		Checked		Drawn ADAM FARIS AHMAD ZAIDY 26/6/2024
Drawing Title ASSEMBLY OF MINI FIREFIGHTING DEVICE				
Part Name				
Part No.				
Rev.	Scale	Projection	Weight	Sheet
0	1:4		8.0 kg	1 of 1



BOM Table		
ITEM NO.	PART NUMBER	QTY.
1	Frame	1
2	Latch	4
3	chain and sproket	2
4	rod	2
5	nozzle	1
6	pipe insert	1
7	DC motor	2
8	water tank	1
9	Water Pump	1
10	pump mount	1
11	Back shaft	2
12	Battery	1
13	Kotak	1
14	Plate	6

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Drawing Title ASSEMBLY OF MINI FIREFIGHTING DEVICE				
Part Name				
Part No.				
Rev.	Scale	Projection	Weight	Sheet
0	1:10		8.0 kg	1 of 1