

# PROTOTYPE DESIGN COLLECTION

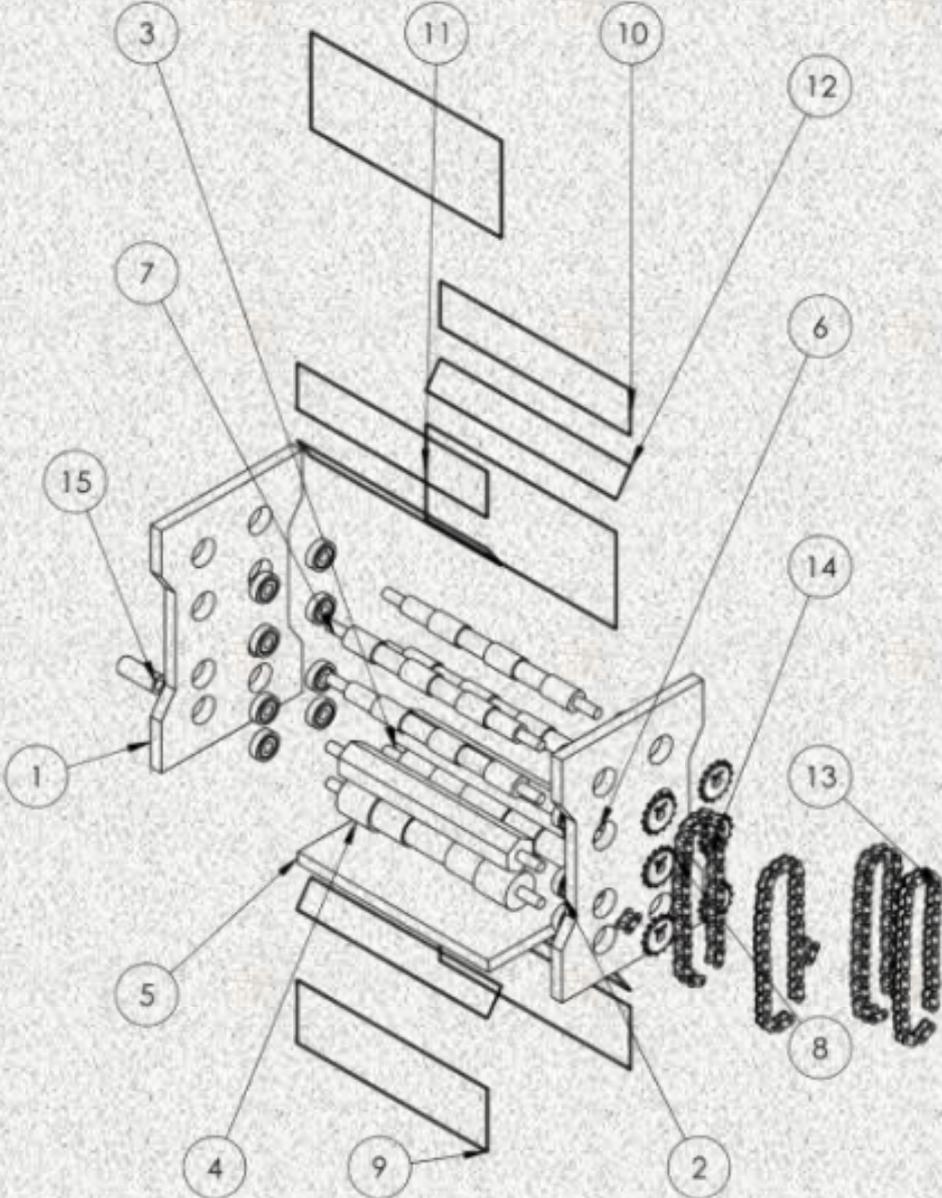
SERIES 4



Universiti Teknologi MARA  
Pasir Gudang Campus

# Prototype Design Collection

## Series 4



Ahmad Najmie Rusli

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**CHIEF EDITOR:**

Ahmad Najmie Rusli

**EDITOR:**

Nurul Nadiyah Rasdi

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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 9

### Convertible Cart-Ladder

Mohamad Aimi Zuhairi Fikri Mohd Aimi Zamani <sup>1</sup>, Najibah Ab Latif <sup>2\*</sup> and Ainaa Maya Munira Ismail <sup>3</sup>

<sup>1,2,3</sup>*Faculty of Mechanical Engineering, Universiti Teknologi MARA Johor Branch, Pasir Gudang Campus, 81750 Masai, Bandar Seri Alam, Johor Darul Ta'zim.*

*\*Corresponding author (e-mail): najibahlatif@uitm.edu.my*

#### PROJECT DESCRIPTION

A multipurpose product is one that can be used for a variety of functions or tasks, making it versatile and cost-effective as well as allowing consumers to save space, money, and time by purchasing a single item that can handle different needs. In this case, a convertible cart-ladder with a built-in cloth hanger is an innovative solution that combines versatility and efficiency in a compact, multi-functional unit has been developed. The fabrication process was taking three phases. The first phase includes the ladder frame followed by the ladder step and its extended. Second phase is including the hanger part and last phase is for cart function. This compact design, with all parts that can be folded, makes it easy to store and saves a lot of space when not in use. The frame is designed to support all its functions, with a folding mechanism that allows it to be easily transformed between the three modes. The cart section consists of a platform for carrying materials, while the ladder section used the platform as a step for climbing. The cloth hanger components have its own feature to hang the cloth and supported by a connector. In conclusion, the multipurpose cart-ladder helped to improve the productivity of the work and solved the storage problem when it not in use. This makes it ideal for use in various settings, including warehouses, retail stores, and homes, where space is limited..

**Keywords:** *Convertible, Cart-ladder*

#### PROTOTYPE



DESIGN PARAMETER

|  |              |
|--|--------------|
| NAME : MOHAMAD AIMI ZUHAIRI FIKRI BIN MOHD AIMI ZAMANI                   |              |
| STUDENT ID : 2022631618  |              |
| GROUP: J4CEEM1105H   |              |
| DRAWING TITLE: DESIGN AND FABRICATE 3 IN 1 CART-LADDER WITH CLOTH HANGER |              |
| SCALE: 1:10  | SHEET 1 OF 1 |

| ITEM NO. | PART NUMBER          | QTY. |
|----------|----------------------|------|
| 1        | Steps                | 3    |
| 2        | Ladder Frame (front) | 1    |
| 3        | Connector Steps      | 2    |
| 4        | Ladder Frame (back)  | 1    |
| 5        | Extended Ladder      | 1    |
| 6        | Handle               | 1    |
| 7        | Cloth Hanger Frame   | 2    |
| 8        | Cloth Hanger         | 3    |
| 9        | 90386A112            | 10   |
| 10       | 92463A897            | 6    |
| 11       | 93850A320            | 6    |
| 12       | 91180A352            | 2    |
| 13       | 93590A107            | 4    |
| 14       | 5537T317             | 4    |

|   |              |
|---|--------------|
| NAME : MOHAMAD AIMI ZUHAIRI FIKRI BIN MOHD AIMI ZAMANI  |              |
| STUDENT ID : 2022631618                                 |              |
| GROUP: J4CEEM1105H                                      |              |
| DRAWING TITLE: EXPLODED DRAWING LADDER AND CLOTH HANGER |              |
| SCALE: 1:15   | SHEET 1 OF 1 |