

PROTOTYPE DESIGN COLLECTION

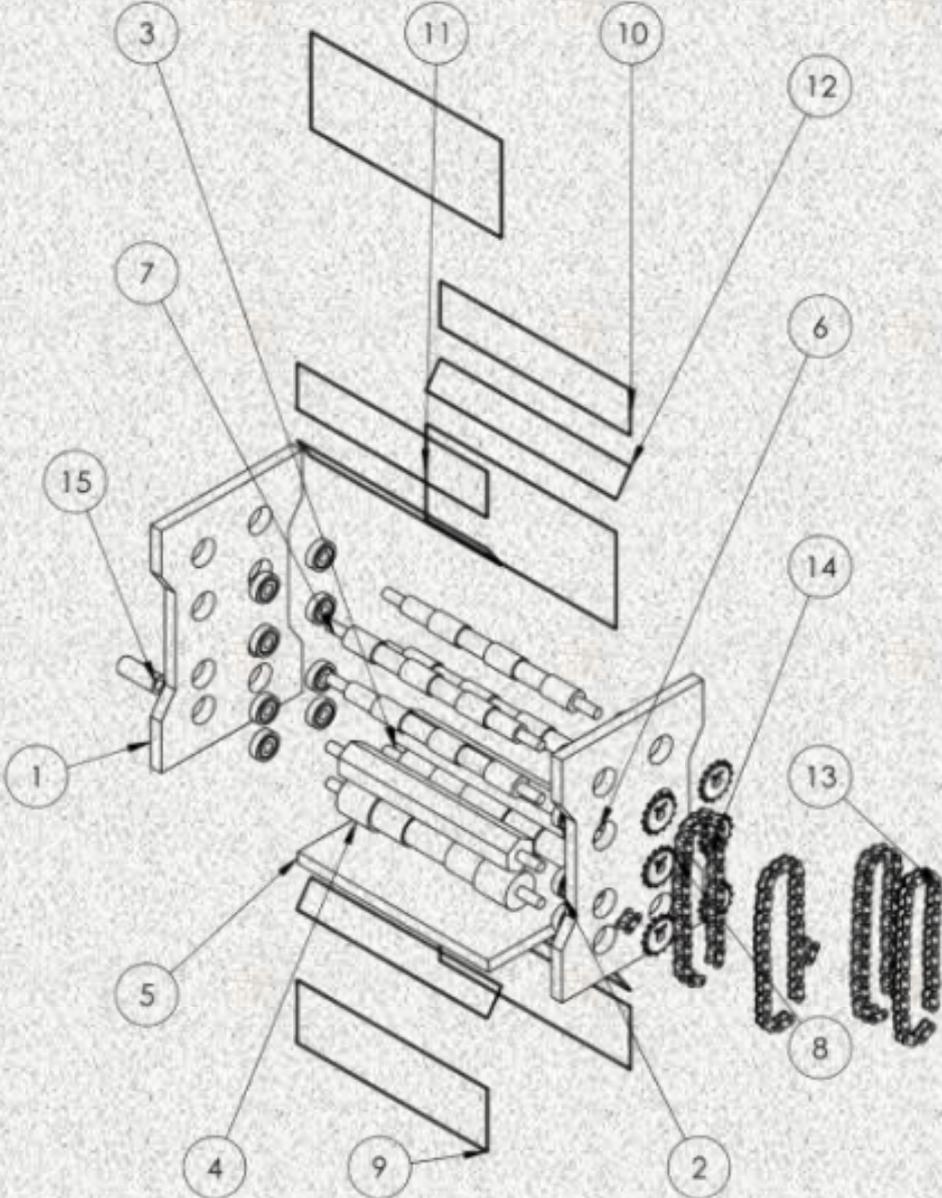
SERIES 4



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 3

Design and Fabrication of a Patient Transfer Aid for Seamless Bed to Wheelchair Mobility

Fateen Aqela Binti Azzaidi ¹ and Miqdad Bin Khairulmaini ^{2*}

^{1,2}*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): miqdadkos@uitm.edu.my*

PROJECT DESCRIPTION

Manual patient transfers between beds and wheelchairs pose significant risks of injury for both caregivers and patients, necessitating the development of a safer and more efficient assistive device. This project focuses on the design and fabrication of a patient transfer aid equipped with a sturdy frame, sliding mechanism, and ergonomic support system to enhance mobility and reduce physical strain. The design process involved concept development, CAD modeling, material selection, and fabrication using lightweight yet durable mild steel for structural stability. Engineering analysis determined the maximum load capacity (120kg), force distribution, and stress analysis on critical components to ensure reliability. The prototype was tested under simulated patient transfer conditions, with results indicating reduction in caregiver effort and decrease in transfer time compared to manual methods. Performance evaluation showed smooth operational movement and adequate weight support, though refinements in frame adjustability, padding comfort, and maneuverability are recommended for future improvements. The findings demonstrate the feasibility of integrating mechanical transfer aids in healthcare environments, offering a safe, user-friendly, and efficient alternative to traditional patient handling methods.

Keywords: *Transfer aid, Mobility*

PROTOTYPE



DESIGN PARAMETER

