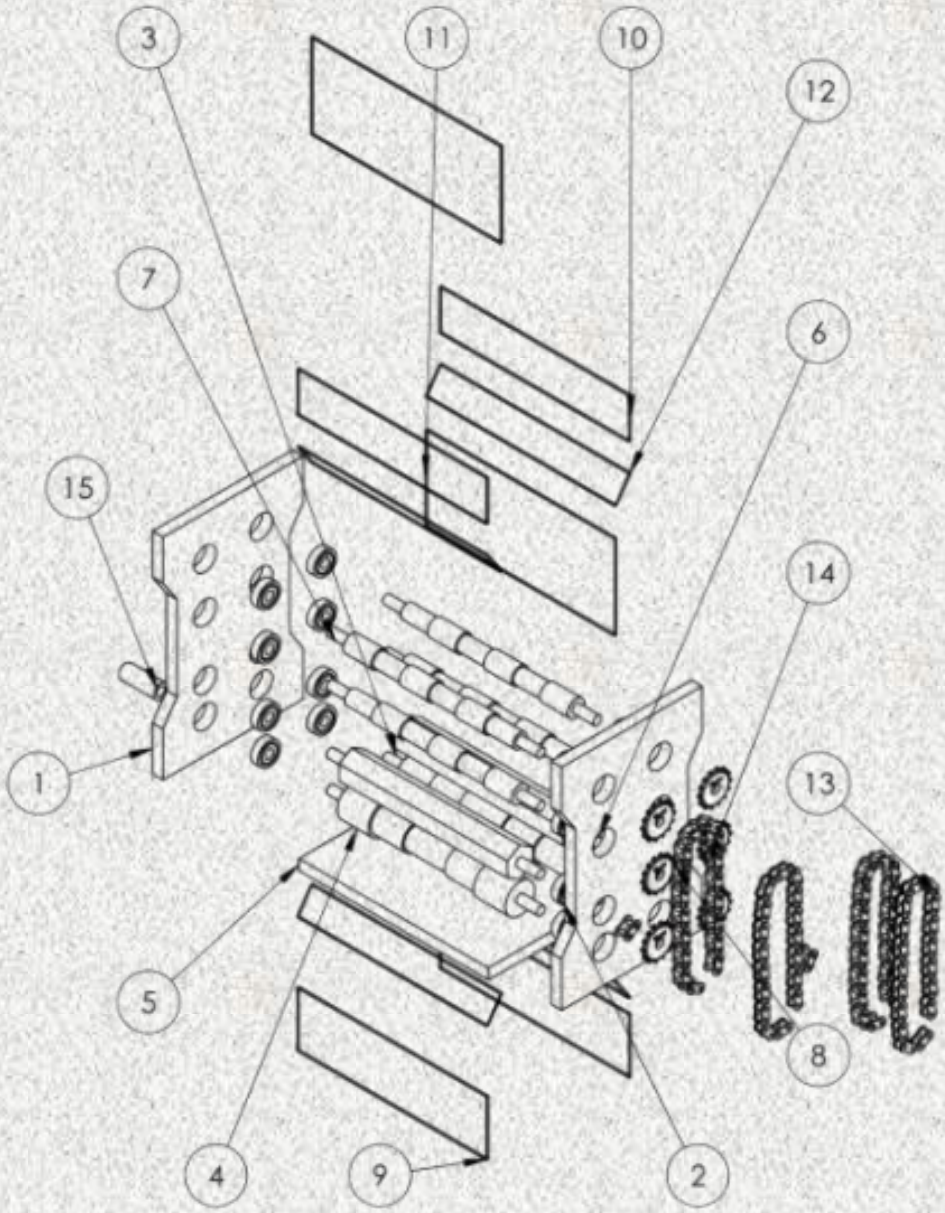
PROTOTYPE DESIGN COLLECTION

SERIES 4

Universiti Teknologi MARA
Pasir Gudang Campus

Prototype Design Collection

Series 4



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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 7

Prototype of a 3D Printing Scrap Recycling Machine

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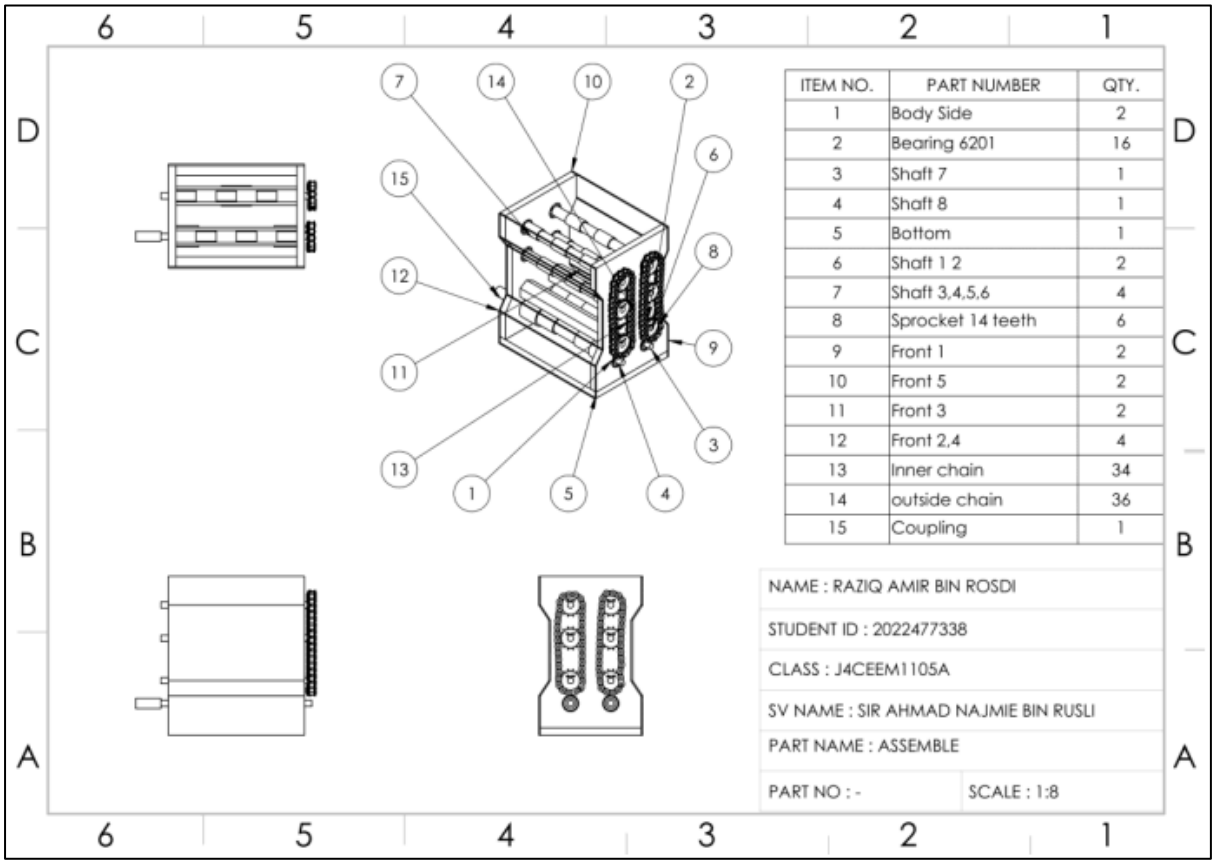
PROJECT DESCRIPTION

This project presents a prototype of a 3D printing scrap recycling machine, designed to process and reduce waste from failed or excess PLA prints. The structure of the prototype is constructed primarily from acrylic and wood, providing a lightweight yet stable frame for demonstration purposes. The core component of the machine is a shredder unit made from solid mild steel cylinders, featuring a three layers shredder system. Each layer having a different shredder diameter. This design enables the machine to efficiently shred large 3D printed parts up to 50mm x 50mm in size. The output from the shredder consists of coarse PLA debris, which can then be further processed into finer particles using an external blender machine for filament re-extrusion or other recycling processes. The system is powered by a 12V DC motor, with power transmission to the shredder layers achieved via a gear and chain mechanism ensuring synchronized and efficient operation across all layers. This prototype demonstrates a scalable and low cost solution for reducing 3D printing waste in small scale or desktop 3D printer.

Keywords: *Shredder, Waste 3D printer*

PROTOTYPE

DESIGN PARAMETER



ITEM NO.	PART NUMBER	QTY.
1	Body Side	2
2	Bearing 6201	16
3	Shaft 7	1
4	Shaft 8	1
5	Bottom	1
6	Shaft 1 2	2
7	Shaft 3,4,5,6	4
8	Sprocket 14 teeth	6
9	Front 1	2
10	Front 5	2
11	Front 3	2
12	Front 2,4	4
13	Inner chain	34
14	outside chain	36
15	Coupling	1

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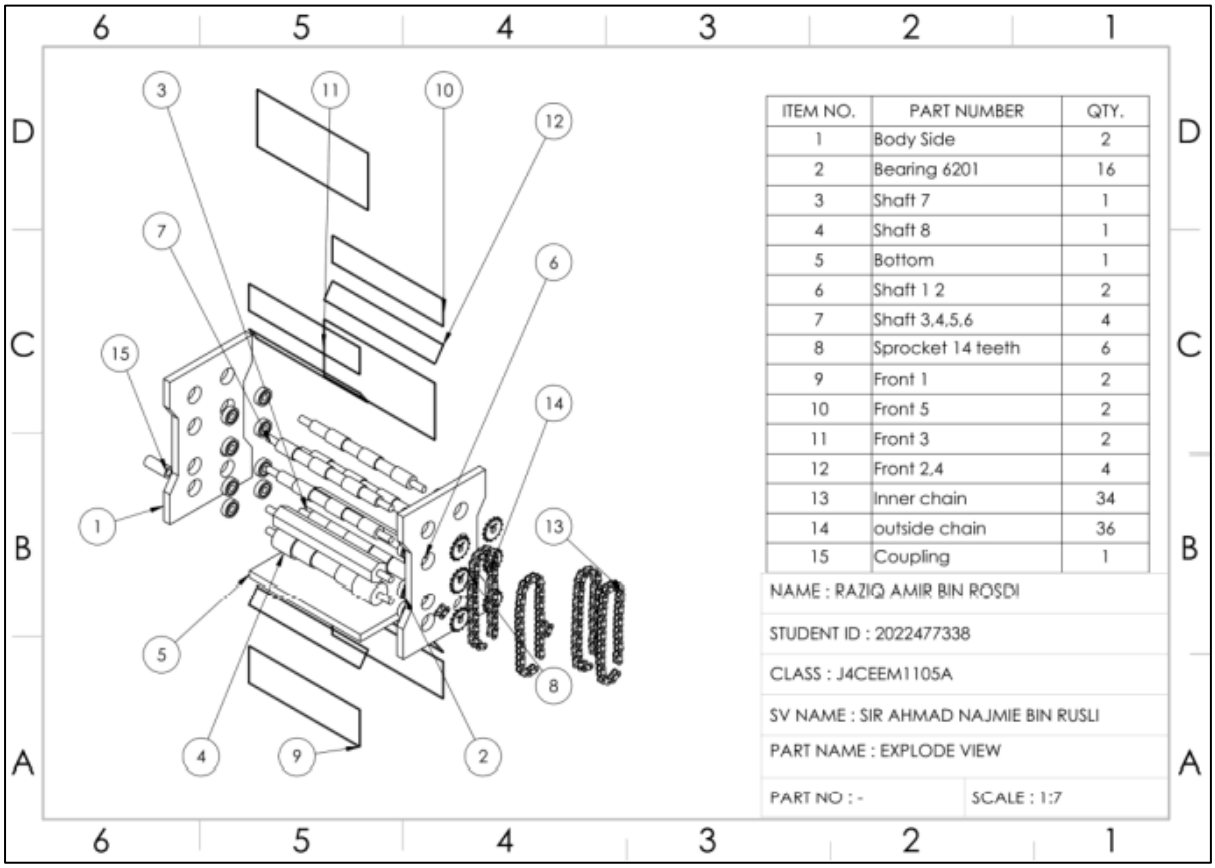

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