

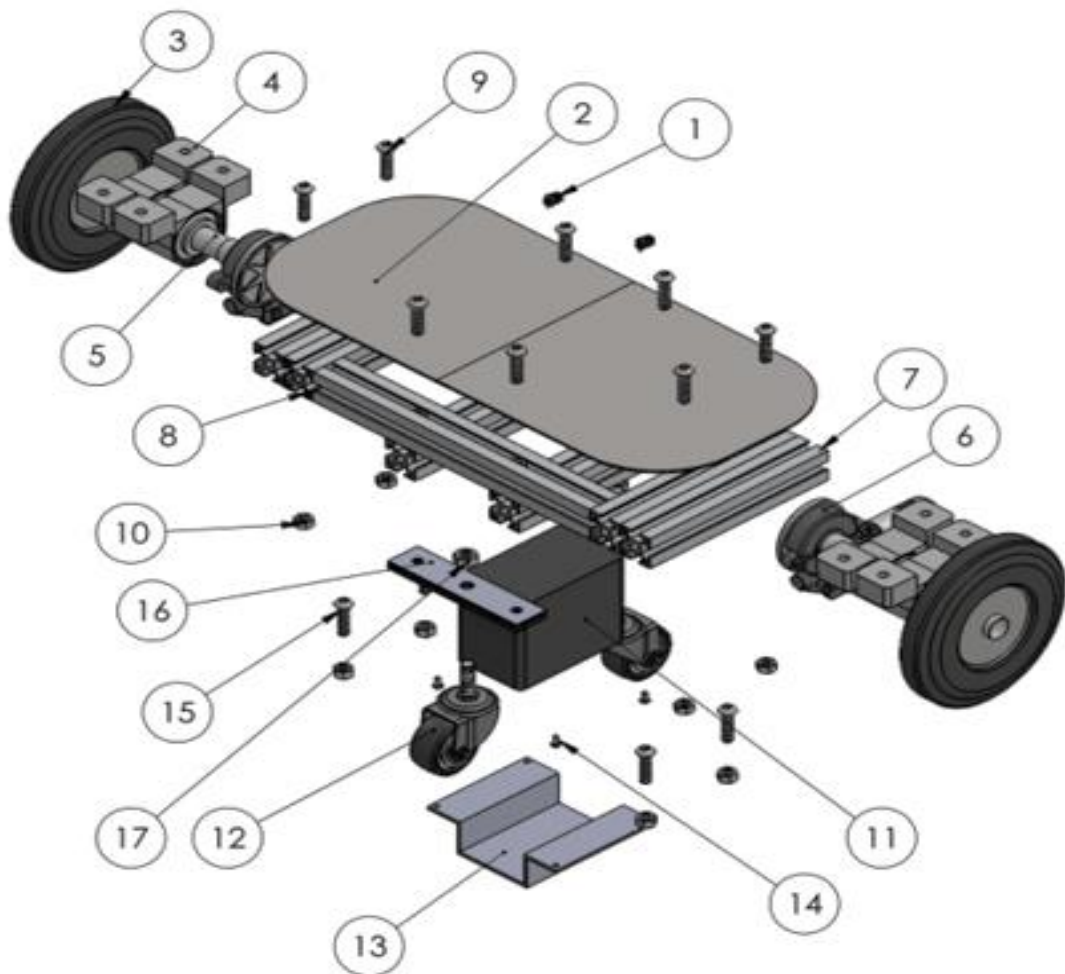
# PROTOTYPE DESIGN COLLECTION

## SERIES 2



# Prototype Design Collection

## Series 2



**AHMAD NAJMIE RUSLI**

**UNIVERSITI TEKNOLOGI MARA CAWANGAN JOHOR  
KAMPUS PASIR GUDANG**

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# FOREWORD

This digital book on Prototype Design Collection Series 2 (PDC Series 2) 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 93

### Design and Fabrication of Hydraulic Pipe Bending Machine

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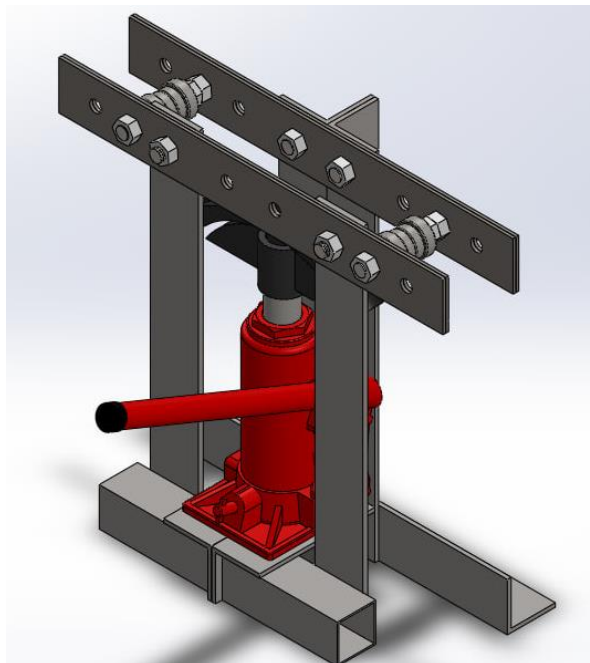
*\*Corresponding author (e-mail): hazriel@uitm.edu.my*

#### PROJECT DESCRIPTION

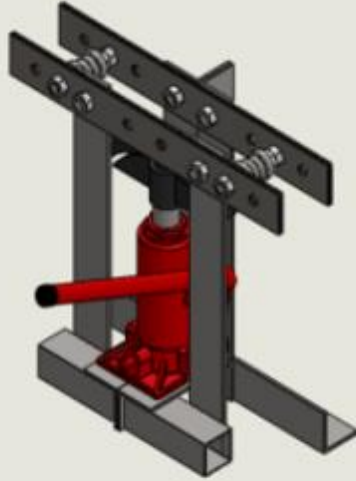
Hydraulic pipe bending machines are used to bend pipes that are made of iron or steel. Standard pipe benders are typically installed in a single location, limiting people's ability to bend a pipe at a specific location, and portable pipe benders are extremely expensive. Due to the difficulties in this situation, the objectives of this project are to create a portable hydraulic pipe bending machine that is both functional and affordable. This project outlined how to design each detail of the pipe bending machine, including the final comprehensive design, the cost of the material, calculations, production specifics, and how to fabricate a hydraulic pipe bending machine that is easy to use for everyone. The results expected from this project are a functional hydraulic pipe bending machine that can withstand the forces that are applied to bend the pipe, especially for mild steel pipe types with a 21 diameter. A hydraulic jack is required as the main component of the machine that will bend the pipe. In conclusion, this affordable and easily handled pipe bending machine will benefit the user that uses it, especially the people that work in bending pipes.


**Keywords:** *Hydraulic, SME, Innovation*

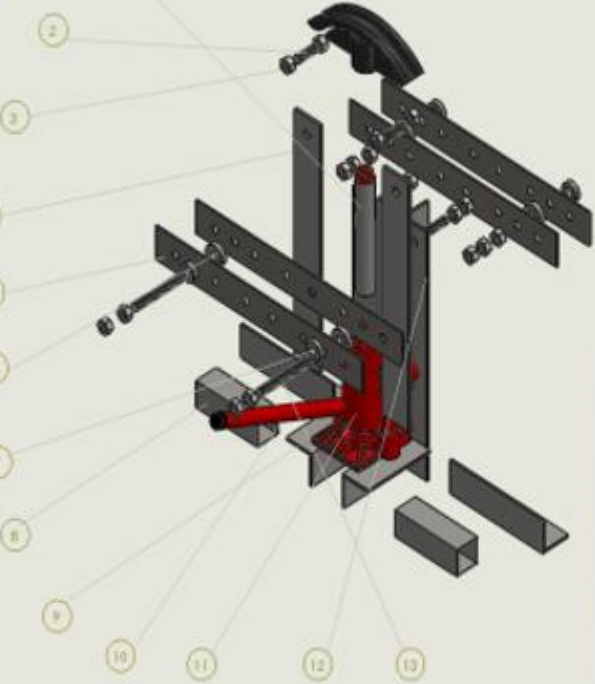
#### PROTOTYPE




DESIGN PARAMETER



FAKULTI KEJURUTERAAN MEKANIKAL (FKM) UNIVERSITI TEKNOLOGI MARA (UTM) JOHOR KAMPUS PASIR GUDANG				
Course Name MEC300 - FINAL YEAR PROJECT 2 SESSION, MARCH 2023 - AUGUST 2023				
Group J4EM1105D				
Approved		Checked		Drawn MUHAMMAD ASYRAF BIN ZADIAL 3150023
Drawing Title ASSEMBLY OF HYDRAULIC PIPE BENDING MACHINE				
Part Name				
Part No.				
Rev. 0	Scale 1:4	Projection 	Weight 7.5KG	Sheet 12/13



ITEM NO.	DESCRIPTION	MATERIAL	QTY.
1		METAL CASTING	1
2	SHORT TREADDED ROD	STAINLESS STEEL	4
3	HEX NUT	CARBON STEEL	10
4	FLAT BAR MILD STEEL	MILD STEEL	2
5	FLAT BAR STAINLESS STEEL	STAINLESS STEEL	4
6	OUTER BALL BEARING	CHROME STEEL	4
7	INNER BALL BEARING	CHROME STEEL	4
8	HOLLOW SQUARE MILD STEEL	MILD STEEL	2
9	ANGLE BAR MILD STEEL	MILD STEEL	4
10	HYDRAULIC JACK HANDLE	MILD STEEL	1
11	HYDRAULIC JACK	HEAVY DUTY STEEL	1
12	ANGLE BAR MILD STEEL 2	MILD STEEL	2
13	TREADDED ROD	STAINLESS STEEL	2

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Approved		Checked		Drawn MUHAMMAD ASYRAF BIN ZADIAL 3150023
Drawing Title EXPLODED ASSEMBLY OF HYDRAULIC PIPE BENDING MACHINE				
Part Name				
Part No.				
Rev. 0	Scale 1:4	Projection 	Weight 7.5kg	Sheet 13/13