

# 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 111

### Development and Designing a Folding Bicycle Stand

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#### PROJECT DESCRIPTION

The invention of a bicycle stand is far from recent, but the implementation of innovative improvements towards the idea is still within reach. One operating principle of these stands is based on lifting the bicycle off the ground and clamping the stays of the bicycle to the stand, so the rear frame of the bicycle is practically suspended in the air, preventing the bicycle from drifting away. Despite proving its usefulness to cyclists, this device has one major flaw which is the lack of portability. This limiting factor could deter the use of such devices in cases where extra labor is intolerable, leaving them unused. Tackling this issue requires two objectives, developing a bicycle stand offering high portability through a foldability feature and fabricating a bicycle stand that is light and easy to carry anywhere. The methodology for the development process consists of function analysis, sketching, 3D modelling, rendering, and making a prototype. The design selected for the fabricated prototype managed to successfully implement a folding feature that allows the bicycle stand to be converted to a more carryable shape. Moreover, the fabricated bicycle stands are very light, weighing only half a kilogram. The overall size of the stand is also small allowing it to either be carried or stored easily. To conclude, the designed folding bicycle stand has the potential to increase interest and use of bicycle stands among average cyclists.

**Keywords:** *Bicycle stand, Portability, Folding capability*

#### PROTOTYPE



### DESIGN PARAMETER

