

**DESIGN AND CONSTRUCTION OF BICYCLE MOTION SIMULATOR:  
HAPTIC PEDAL FEEDBACK SYSTEM WITH ROLLING RESISTANCE  
IMPLEMENTATION**

By

David Wiryawan Rusli

11401014

BACHELOR'S DEGREE

in

MECHATRONICS ENGINEERING

FACULTY OF ENGINEERING AND INFORMATION TECHNOLOGY



SWISS GERMAN UNIVERSITY

The Prominence Tower

Jalan Jalur Sutera Barat No. 15, Alam Sutera

Tangerang, Banten 15143 - Indonesia

July 2019

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Revision after the Thesis Defense on July 8<sup>th</sup> 2019

## STATEMENT BY THE AUTHOR

I hereby declare that this submission is my own work and to the best of my knowledge, it contains no material previously published or written by another person, nor material which to a substantial extent has been accepted for the award of any other degree or diploma at any educational institution, except where due acknowledgement is made in the thesis.

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## ABSTRACT

### DESIGN AND CONSTRUCTION OF BICYCLE MOTION SIMULATOR: HAPTIC PEDAL FEEDBACK SYSTEM WITH ROLLING RESISTANCE IMPLEMENTATION

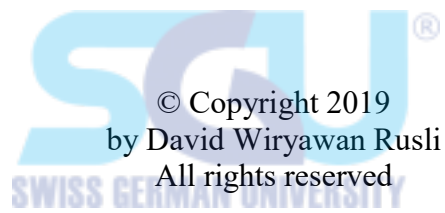
By

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The objective of this thesis is to design and construct a road resistance simulation to be used on a bicycle motion simulator. The road resistant force is created by a roller compressing the rear tire of the model bicycle, generating a retarding force effect on the rotation of the rear tire. An IBT-2 motor driver is used to drive a linear actuator connected to the roller to simulate the road resistance. The main controller for the simulator is an Arduino Mega 2560, which receives all the sensor data and returns an output signal to the motor driver.

*Keywords: Bicycle Simulator, Road Resistance Simulation, IBT-2 Motor Driver*



## DEDICATION

I dedicate this thesis to

My family, who have supported me during the making of this paper,  
My friends and lecturers who has taught me along the time in university,

PT. Prime Technology Indonesia as the sponsor of this thesis,

And to my country, Indonesia



## ACKNOWLEDGEMENTS

The author would like to express his sincere thanks to his thesis advisor, Dr. Eka Budiarto, S.T., M.Sc and Leonard P. Rusli, M.SC., Ph.D. for all the guidance and advice throughout the process of the creation of this thesis project. The author would also like to thank PT. Prime Technology Indonesia, for giving the possibility to work on the project and continuous support. The author also want to thank Reinaldo Qiu, who has worked alongside the creation of this thesis for the support, help and encouragement.

The author would like to express his gratitude to all his personal friends who has been his source of technical and moral support throughout this research. Aside from than the author would also like to thank all lecturers and his colleagues in Swiss German University's Mechatronics Department.

The author would finally like to give thanks to his beloved parents and family who gave continuous support, help and encouragement to finish this thesis work during the time taken to finish this thesis.



## TABLE OF CONTENTS

STATEMENT BY THE AUTHOR.....	3
ABSTRACT.....	4
DEDICATION.....	6
ACKNOWLEDGEMENTS.....	7
TABLE OF CONTENTS.....	8
LIST OF FIGURES.....	11
LIST OF TABLES.....	13
CHAPTER I – Introduction.....	14
1.1. Background.....	14
1.2. Thesis Purpose.....	15
1.3. Thesis Problems.....	15
1.4. Thesis Questions.....	16
1.5. Thesis Scopes.....	16
1.6. Significance of Study.....	16
1.7. Thesis Organization.....	16
CHAPTER II – Literature Review.....	18
2.1. Motion Simulator.....	18
2.2. Bicycle Simulator.....	18
2.3. Haptic Pedal Weight.....	21
2.4. Maximum Road Gradient for Cycling.....	21
2.4.1. Limit Due to Center of Mass.....	22
2.4.2. Limit Due to Friction.....	23
2.4.3. Limit Due to Human Power.....	25
2.5. Human Power.....	26



2.6.	Cycling Aerial Drag Force .....	27
2.6.1.	Projected Cross-Sectional Area ( $A_p$ ) .....	28
2.6.2.	Coefficient of Drag ( $C_D$ ).....	28
CHAPTER III – Methodology.....		30
3.1.	Design Overview.....	30
3.2.	Components of Design.....	31
3.2.1.	Bicycle .....	31
3.2.2.	Arduino Mega 2560 .....	32
3.2.3.	PC.....	32
3.2.4.	Game Data Package .....	33
3.2.5.	H-Bridge .....	34
3.2.6.	Linear Motor .....	35
3.2.7.	Roller.....	35
3.2.8.	Reed Switch .....	35
3.3.	Mathematical Modelling .....	36
3.3.1.	Maximum Road Incline for Cycling.....	36
3.3.1.1.	Limit Due to Center of Mass .....	36
3.3.1.2.	Limit Due to Frictional Force.....	37
3.3.1.3.	Limit Due to Human Power.....	37
3.3.2.	Retarding Forces .....	38
3.4.	Mechanical Design.....	39
3.4.1.	Mechanical Design Overview.....	39
3.4.2.	Mechanical Design Calculation .....	40
3.4.3.	Spring Loaded String Potentiometer Design .....	41
3.4.3.1.	Working Principle.....	41
3.4.3.2.	Sensor Selection .....	42
3.4.3.3.	Initial Design .....	43

3.4.3.4.    Final Design.....	45
3.5.    Electrical Design .....	47
3.5.1.    Electrical Design Overview .....	47
3.5.2.    Electrical Subsystems .....	48
3.5.2.1.    Linear Motor Movement .....	48
3.5.2.2.    Motor Positioning.....	48
3.5.2.3.    Speed Sensing.....	49
3.5.3.    Arduino Wiring.....	49
3.6.    Algorithm Design.....	50
3.6.1.    Algorithm Design Overview.....	50
3.7.    Control System.....	52
3.8.    Testing Methods.....	54
3.8.1.    Linear Motor Speed Test .....	54
3.8.2.    Roller Loading on Rear Tire.....	55
CHAPTER IV – Result and Discussion.....	56
4.1.    Testing Results .....	56
4.1.1.    Linear Motor Speed Test .....	56
4.1.2.    Roller Loading on Rear Tires .....	58
4.2.    Final Results.....	59
CHAPTER V – Conclusion and Recommendation .....	63
5.1.    Conclusion.....	63
5.2.    Future Recommendations.....	64
REFERENCES .....	65
APPENDIX.....	67