ERGONOMIC STUDY OF CYCLISTS USING JACK HUMAN MODELING AND BIOMECHANICS ANALYSIS

by

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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

ERGONOMIC STUDY OF CYCLISTS USING JACK HUMAN MODELING AND BIOMECHANICS ANALYSIS

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Most people tend to choose cycling as their favorite type of sports activity. The purpose of this study is to assess the impact of cycling activity towards cyclist's health and find the factor that can significantly affect their upper limb posture. Based on research, cycling can cause neck pain, upper back pain, lower back pain, shoulder pain, and wrists pain. Questionnaires have been distributed to the cyclists in a bicycle community in Cibubur and BSD City. This study uses statistical analysis, human jack simulation and biomechanics analysis with 50 respondents. For statistical analysis, correlation analysis shows the relation between age, gender, height, weight, respondent's activity and respondent's health with the comfort level while cycling with p-value < 0.05. Moreover, regression analysis is also conducted to find the impact of independent variables (factors) towards comfort level while cycling which obtains results that handlebar position, saddle position, and cycling frequency are factors that can significantly affect the cyclist's posture compared to the other factors. Several analyses in Human Jack Simulation™ are also conducted to support the research. Fatigue analysis, lower back analysis, OWAS, and RULA has determined that cycling activity can give bad impact to cyclist's posture and health. Biomechanical analysis is also performed to determine appropriate cycling posture and bicycle setting which is fit and comfortable for cyclist's body to reduce the risk of cycling.

Keywords: Sports Ergonomics, Biomechanics, Human Machine Interaction, Human Jack Simulation™

DEDICATION

I dedicate this work to my parents and my brother,
who have given me all the supports I need,
and to my lecturers in Industrial Engineering,
who have taught me nothing but important lessons.

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