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Yogyakarta, November 2018



Nadia Zhafira

THESIS APPROVAL OF SUPERVISOR

**DEVELOPMENT OF THE ERGONOMIC MAXIMUM WRIST POSTURE FOR
INDONESIAN USING ELECTROMYOGRAPH**

THESIS

By

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Yogyakarta, November 2018

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الجمعة التي استأنسها
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(Ir. Hartomo Soewardi, M.Sc., Ph.D.)

THESIS APPROVAL OF EXAMINATION COMMITTEE

**DEVELOPMENT OF THE ERGONOMIC MAXIMUM WRIST POSTURE FOR
INDONESIAN USING ELECTROMYOGRAPH**

By

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Had been defended in front of Examination Committee in Partial Fulfillment of
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Department Faculty of Industrial Technology

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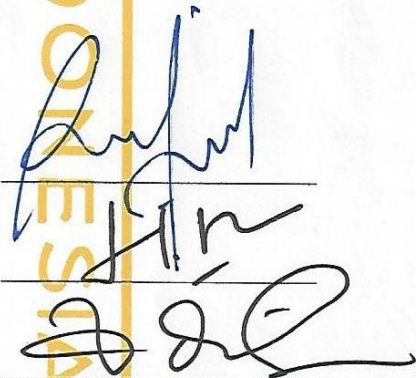
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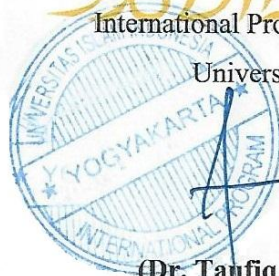


Acknowledged by,

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DEDICATION PAGE

This undergraduate thesis I dedicate to,

My Eternal Love, Mama, Ayah, Mia, and Hanief

Whenever I said family comes first, I really mean it

My Super Class, International Program Industrial Engineering 2014

Where I learn a lot of things

My Ranger, DSK&E 2014

Where they put their trust and walk together to be a better us

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Uci, who I promise to invite her to my graduation. I love you.

My Alma mater, Universitas Islam Indonesia

With all those chances, values, and lessons I got from lecturers, staffs, and colleagues

MOTTO

Pressure Makes Diamond

Also,

I believe that my parents give me a beautiful name to reminds me that,

Man Shabara Zhafira

PREFACE

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Highest efforts undertaken in this study will not be enough to make this study become the perfect one. Some shortcomings and weaknesses realized by the author and supportive suggestions are fully expected. Last but not least, the author hopes that this study will be beneficial and bring advantages for the readers.

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Nadia Zhafira

ABSTRACT

Carpal Tunnel Syndrome (CTS) is one of the most common neuropathies which occurs due to repetitive activity of hand using non-neutral wrist posture whether in flexion, extension, or ulnar and radial. Even though this posture may be inevitable, however it should be confined in the ergonomic maximum range. Thus, it is necessary to develop the allowable of maximum deviation of wrist. Objective of this study is to determine the maximum range of wrist postures in such four motions with evaluating the muscle contraction at wrist. A case study applied is to type a manuscript using computer. Experimental study was conducted by using electromyograph to identify Maximum Voluntary Contraction (MVC) on Flexor Digitorum Superficialis (FDS) and Abductor Pollicis Brevis (APB), two of muscles which moves the finger and innervated by Median Nerve, the only nerve through Carpal Tunnel. Fourteen healthy university students (7 females, 7 males) participated in the study with age between 20 to 23. They fulfilled the requirements as study participants which are proficient in operating computers and had no evidence of CTS and wrist musculoskeletal disorders. The statistical analysis was conducted to test the hypothesis. Result of this study shows that as the angle inclination increases in both extension, flexion, ulnar, and radial wrists motion, the muscle contraction were increasing and typing performance which showed WPM were decreasing. Based on %MVC as well as statistical analysis, the suggested maximum wrist posture range is not greater than 30° extension, 20° flexion, 20° ulnar, and 10° radial, although the neutral posture of 0° was highly suggested. This guideline is proven to be valid for both male and female.

Keywords: Wrist posture, Typing, Electromyography, Flexor Digitorum Superficialis, Abductor Pollicis Brevis