A Study for Muscular Strength Profiles of Korean Population

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Abstract: A series of three different laboratory studies were conducted to measure the isokinetic muscular strength profiles of Korean population and to investigate ethnical difference between Korean and Western populations. Each study measured upper body torque strength using different hand tools, push and pulling strength, and lifting strength, respectively. The results of three different strength studies showed that muscular strength ratio between female and male population was between 45\% and 54\% depending on strength type which is much less than general findings in the field of ergonomics that the maximum muscular strength of females is, on the average, 65\% to 75\% of males. Reasons of this difference could be explained in many aspects including ethnical, social and cultural differences. It suggests that application of same profile of muscular strength of western females and MMH guidelines such as NIOSH Lifting Guidelines should be carefully considered in Korean population and possibly oriental countries as well since females in this region may possess less physical capability compare to that of western populations. Profiles of different muscular strength data of Koreans are provided.

Keywords: Muscular Strength, Korean, MMH, Ethic and Gender Differences.

1. Introduction

Although the technological developments such as an automation in modern industrial society have contributed in the improvement of productivity, there still are lot of jobs that require physical strength of human being as the major source of power to perform the tasks. Especially in the manufacturing industries, many jobs are still in the forms of labor-intensive (i.e. MMH) which involve the use of upper body and lower back muscular strength as main source of power to perform the tasks. And this physical overload is one of the major contributing factors for the onset of WMSDs (work-related musculoskeletal disorders).

Three main components which affect the performance of MMH are known as the worker, the task, and the environment components (Ayoub & Mital, 1989). Among these three components, the worker component is most difficult to change and improve the character since it is the nature of human being. Therefore, the physical characteristics and capabilities of workers should be carefully considered in designing the task, work intensity and working environment to reduce the risk of occupational diseases.

Among various factors in human (worker) component, gender is one of the important factors in designing tasks. Also ethnic difference is important factor to be considered in globalizing industries. General findings in ergonomics are that the maximum muscular strength of females is, on average 65\% to 75\% of maximum strength of males. This physical strength ratio can be different in various ethnic groups (Kim & Kim, 2000). Hence, a series of studies have been conducted to measure muscular strength profiles of Korean for last 15 years in an ergonomics laboratory at a university in Korea.

2. Method and Procedure

Three different studies measured the muscular strength profiles of Korean in terms of upper body torque exertion capacity, push/pull forces, and lifting strengths, respectively. Detailed descriptions of the three different studies are presented as followings.