

ABSTRACT

The design of the ergonomic material handling equipment is the way to overcome musculoskeletal disorders (MSDs). The implementation of material handling equipment shows that there are several issues addressed such as the success rate of the operator in using the equipment has a percentage of 57%, the high number of errors in using the equipment, and user complaints related to equipment usage. Therefore, those problems need to be solved.

In this study, the design improvement is using Eppinger Ulrich product development method. Furthermore, the result is tested using usability testing and work physiology, so that the comparison between prototype of material handling equipment in improvement 1 and prototype of material handling equipment improvement in 2 is obtained based on product usability and ergonomics aspects of the work physiology.

The results of study is the prototype of material handling equipment that is easy to use, effective, efficient, and satisfying user. The analysis of usability testing and work physiology leads to the smaller number of working time, success rate, number of errors , and user complaints when using improvement 2 compared to improvement 1. The result of questionnaire depicts the average user response of learnability aspect is 4.19, 4.84 of efficiency aspect, 4.61 of memorability aspect, 4.6 of error aspect, and 5.03 of satisfaction aspect based on the Likert Scale 1-5. Besides that, based on the analysis of the equipment influence on the operator physiology, there is a decreased percentage in cardiovascular load from 32% to 20% when using prototype of material handling equipment in improvement 2. It shows that prototype of material handling equipment in improvement 2 can increase the effectiveness and efficiency of the operator.

Keywords: *material handling equipment, Ulrich Eppinger methods, product improvement and testing, usability testing, work physiology.*