IBIMA Publishing
Communications of International Proceedings
https://ibimapublishing.com/p-articles/44ENG/2024/4442424/
Vol. 2024 (14), Article ID 4442424

Evaluation of Ergonomic Solutions in Agriculture by Means of the sEMG System and Portable Computer*

Alicja TOMASZEWSKA, Łukasz KUTA, Natalia FILIPECKA, Mariola WALASZCZYK
Sebastian JERZYŃSKI, Remigiusz PLEWA and Martyna FILIPOWICZ

Institute of Environmental Protection and Development, The Faculty of Environmental Engineering and Geodesy, Wrocław University of Environmental and Life Sciences, Wrocław, Poland

Correspondence should be addressed to: Łukasz KUTA, lukasz.kuta@upwr.edu.pl

* Presented at the 44th IBIMA International Conference, 27-28 November 2024 Granada, Spain

Abstract

Nowadays, physical overload at work of the employees is a very serious problem all over the world. It leads to various occupational ailments and diseases. Moreover, very often the changes in the body are irreversible. There is also often a problem with diagnosing physical overload at work. These circumstances, as well as shortage in the literature a human workload assessment in some professions i.a. welding, farming leaded to arrange a study in which it was decribed the possibilities of use special construction - exoskeleton on human body in order to work more ergonomically. This technical solution put on human body (back, arms, legs) should reduce muscle strain during work. Hence, this paper includes a pilot study in area of ergonomics at work in connection with innovative technologies that can be implemented to improve work conditions.
The aim of this study was to assess the effectiveness of the exoskeleton use during welding work carried out by farmers. For this purpose, the sEMG method was used to assess muscle load. The sEMG system consisted of four elements; the electrodes, preamplifier, the Wi-Fi adapter and a portable computer. The electrodes were placed on skin and then recorded muscle tension. First, workers (farmers) were tested without the exoskeleton, and then with the exoskeleton. The pilot studies confirmed that the exoskeleton effectively improved work conditions, muscle's tension expressed as MVC (%) decreased about 25%. Another interesting area was an analysis of the profitability of an exoskeleton purchase, because one kit costs several dozen thousand zlotys and not all companies can buy it.

Keywords: exoskeleton, work ergonomics, agriculture, static load

Cite this Article as: Alicja TOMASZEWSKA, Łukasz KUTA, Natalia FILIPECKA, Mariola WALASZCZYK Sebastian JERZYŃSKI, Remigiusz PLEWA and Martyna FILIPOWICZ Vol. 2024 (14) "Evaluation of Ergonomic Solutions in Agriculture by Means of the sEMG System and Portable Computer " Communications of International Proceedings, Vol. 2024 (14), Article ID 4442424, https://doi.org/10.5171/2024.4442424