

Ergonomic Principles and Regulatory Standards Related to Personal Protective Equipment (PPE) Used in the Textile Industry

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ABSTRACT

The article describes a survey that aimed to point ergonomic principles and regulatory standards related to personal protective equipment (PPE) used by workers in textile industries in Joinville, SC, Brazil. The research took place in the form of semi-open questionnaire, along with seventy-three workers from the productive sector of two textile companies in Joinville, including men and women of various ages. One of the companies was of medium size, with a focus on textile processing. The second was a large one, focused on manufacturing knitwear and clothing. Through research it was possible to identify types of safety equipment used in this industry segment and, thus, it emerged that are not used particular PPE but the same as used in other areas of work involving risks to physical and psychological integrity of the employee. From the relationship between the ergonomic principles and regulatory standards it could be suggested aspects that deserve attention in the design and analysis of PPE. As well, some questions emerged that may originate other studies in this area.

Keywords: PPE, Textile Industry, Ergonomics, Regulatory Standards.

INTRODUCTION

This article describes an exploratory research project aimed at identifying ergonomic principles and regulatory standards related to PPE used by workers in the textile industry in Joinville, SC.

PPE consist of devices and accessories for use by workers whose job puts their health or physical integrity at risk. The use of this equipment is obligatory when the safety measures to be taken are not effective (Brasil, 2011). However, studies show the misuse or even the non use of PPE by operators and workers due to being inconvenient or uncomfortable, or to a lack of information regarding their correct use or, in some cases, a lack of safety management programs at work (Peloso and Zandonadi, 2012). Based on this scenario, a group from the textile segment was selected from among many others, not just because of the connection with one of the authors who had worked in this sector but because the city in which the study was conducted is one of the centers of this segment in the region. For this study, theoretical aspects about ergonomics were investigated, as well as their importance for PPE, in addition to regulatory standards related to textile industry activities. The study, which was descriptive in nature, was divided into three stages: (1) literary revision of ergonomics and their importance in PPE. Learning about the regulatory standards found in textile industries, through bibliographic means, documents, books and in scientific articles related to ergonomics, PPE and regulatory standards; (2) identification of PPE types used in the Social and Organizational Factors (2020)

textile industries of Joinville; (3) study of ergonomic principles and regulatory standards related to PPE used in the textile industry.

PPE AND REGULATORY STANDARDS

According to the Regulatory Standard no. 6 – NR 6 (BRASIL, web), personal protective equipment includes the “device or product for individual use by the worker as protection against risks likely to threaten safety and health at the work place”. Thus, PPE is intended to protect the worker, preventing or lessening the severity of accidents and protecting the body and organism from the harmful effects of toxic substances, excessive noise etc. The use of such devices is provided for in laws for certain activities and in the service and industrial segments such as textile, metal mechanics, civil construction and printing, among others.

According to Bitencourt and Quelhas (1998), on 8th July 1987, Ordinance No. 3,214 was implemented, which defines Regulatory Standards (Normas Regulamentadoras-NRs). These, which are still in effect, refer to work safety and medicine and determine that companies must comply with the standards set in order to minimize or avoid problems related to the work environment and to occupational health (Bitencourt and Quelhas, 1998). With the evolution of large industries, various standards have been created. Currently, there are 36 NRs, among which is the standard that regulates the use of PPE, implemented on 8th July 1987, under Ordinance No. 3,214 (Brasil, 2008).

The standard which specifically covers the use of PPE is NR 6. This standard determines the obligatory use of PPE, which must be appropriate to the risk and freely distributed to workers by the company when overall accident prevention measures do not offer complete protection (Brasil, 2011). The NR 6 further states that it is the responsibility of the employer to ensure the proper use of PPE and keep a record of their distribution to the worker (Brasil, 2011). The worker should be given guidance on correct use, methods of conservation, how to clean and periodic maintenance of the PPE that they are provided with (Brasil, 2011). Thus, the worker is obliged to use the protection equipment in the proper manner for the purpose for which it was intended while being responsible for storing and looking after the PPE in compliance with proper use of the equipment as determined by the employer (Brasil, 2011). In addition to NR 6 related to PPE, it is also important for this study to mention the standard that refers to Ergonomics.

The NR 17 establishes the adaptation of work conditions to the psycho-physiological characteristics of the workers so as to provide maximum comfort, performance and safety, including work conditions in aspects related to transport, handling and unloading of materials, from the furniture and equipment to environmental conditions at the work station, as well as its organization (Brasil, 2007).

It is thus verified that the aim of ergonomic measures such as PPE is to offer safety and well being to the worker in the work environment. Therefore, considering the object of this study, it can be said that the NR 6 and the NR 17 are supplements. The importance of recognizing the ergonomic principles applied to products should be emphasized in order to be able to establish analysis criteria as well as to guide questions addressed to the operators who are the target of this study.

ERGONOMICS

With the increase of capital and the evolution of industries, the role of their workers have become more complex with the passing of time, leading to an increase in work accidents and incidents (Iida, 2002). Considering this, Ergonomics can provide safety measures through reducing work related psycho-physiological factors, thus offering improved suitability or adaptation of the object to individuals, aimed at their safety and comfort as well as the efficient use or operation of the objects in human activities and tasks (Gomes Filho, 2003). The author (2006) further points out that Ergonomics addresses problems related to physical configurations and features such as the

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functional and perceptual qualities of use by making use of analytical and diagnostic tools as well as observing detected problems. These are related to various factors, possibly contributing to a decrease in the quality and performance of human activities as well as causing insecurity and discomfort for the user (Gomes Filho, 2006).

According to Soares et al. (2001), most accidents with products can be attributed to their use, to design related factors, to the environment in which they are used and also to user behavior. Given this, it is worth remembering that PPE does not overall prevent accidents but it does prevent injuries, natural accidents such as contact with toxic agents. In order for this equipment to follow ergonomic principles it must offer the user comfort, safety and efficiency at work.

ERGONOMIC AND REGULATORY ASPECTS RELATED TO PPE USED IN THE TEXTILE INDUSTRY

A study was conducted on the types of PPE used in the textile industry with seventy-three workers from the productive sector of two textile companies in Joinville, consisting of men and women of varying ages. One of the companies was of medium size, focused on textile processing. The other was a much larger company, focused on manufacturing knitwear and clothing. Information was collected through a semi-open questionnaire conducted by Pozza et al. (2014).

Thus, among the PPE used in the textile segment, the following can be cited: ear plugs, muffler, helmet, breathing mask, face mask, goggles, gloves, aprons, overalls, special pants, leather shoes and boots. The most commonly used PPE is the leather shoe, which was used by almost all the productive sectors in the companies studied (Pozza et al., 2014). Other PPE is distributed in accordance with the job performed by the worker. It is understood, however, that the productive sector of a single company has different functions, each one with its own functional specifics and safety needs. Taking the Ergonomic objects into account, as highlighted by Gomes Filho, and the objects of the exploratory research herein described, it can be said that the ergonomic aspects related to PPE include both the psycho-physiological factors of the users as well as the suitability of the equipment for these users, providing them with safety, comfort and efficiency in performing their tasks. While considering PPE ergonomics as an isolated product, it is deemed important to pay attention to their physical features and configurations. It has been found that PPE is used in various sectors in textile companies for different functions and by people with varying body compositions, including both men and women. Thus, it is important to verify PPE characteristics such as: material from which it is made; modeling or shape; size, weight, colors, mode of wearing. When taking the ergonomics of the PPE into account as work equipment for workers to carry out their tasks, it is important to analyze the functional and perceptual qualities of the equipment. The functional qualities may establish: if the equipment is comfortable; if it helps the worker in performing the task. The perceptual aspects can cover questions related to the psychological well being of the user regarding the PPE, seeking to establish if it is considered to be ugly or beautiful and if the worker feels confident in performing his/her task using said equipment.

In relation to the NRs 6 and 17 pertaining to PPE and Ergonomics, respectively, there are several aspects that can guide research focused on PPE in various segments other than the textile segment. The NR 6 states that the PPE must be adapted to the risk to which the user is subject to. In this case, does the PPE offered to workers today meet this criterion? Does it provide adequate safety for the user when performing of their tasks? Another point highlighted in the NR 6 is the importance of the proper use of the PPE as well as guidance on its correct use, conservation methods, ways of cleaning and periodic maintenance. Based in this, an opportunity was identified for instructional design projects that could guide users in relation to the use, care and maintenance of PPE. The NR 17 relates to Ergonomics and addresses the ergonomic principles already mentioned in this topic – efficiency, comfort and safety.

CONCLUSIONS

The aim of the aspects addressed in this article was to relate the ergonomic principles and regulatory standards to the Social and Organizational Factors (2020)

PPE used in the textile industries. Through the research it was possible to identify the types of safety equipment used in this industrial segment and, thus, ascertain that specific PPE is not used, and the equipment that is used is the same as the equipment in other work areas the physical and psychological integrity of the worker is at risk.

Based on the relationship established between the main ergonomics and regulatory standards, this can suggest aspects that deserve attention in the PPE project and analysis. Furthermore, certain questions appeared that could give rise to other studies in this area.

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