The Importance of Ergonomics in Industrial Engineering

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Introduction

All around the world, occupational health and safety is a major concern within all economic sectors and particularly within industry. As it can be deduced from the name this discipline focuses on the protection of the safety, health and welfare of people engaged in work. For obvious reasons, the first concern of the discipline has been (and should be) the elimination, if possible, or minimization of work-related deaths, either as a result of occupational accidents or illnesses. Once this goal has been more or less achieved, and never forgetting it, efforts tend to focus on reducing workplace nonfatal injuries and illnesses. This has been the historical evolution of occupational health and safety.

However, for some time there is a new source of concern focusing on work-related damages which, although usually not severely disabling, significantly impair workers’ quality of life and productivity. These could be called “ergonomic-related disorders” or better disorders related to a lack of ergonomics.

Ergonomics

Industrial ergonomics could be defined as the branch of science that aims at achieving an optimal fitting of the work environment and job activities to the worker. The work environment can affect a worker’s performance in many different ways varying from health damage to effects that reduce the individual’s ability to perform a task or those that cause dissatisfaction and uncooperative attitudes. The scope of ergonomics include physical work load, posture at work, lifting and carrying, machine-human system interaction, but also lighting, thermal comfort and noise. It deals with the assessment of human’s capabilities and limitations, work and environmental stress, static and dynamic forces on the human body structure, fatigue, etc.

Ergonomic-related disorders

As previously stated, the exposure to poor ergonomic conditions does not result in fatal injuries. The development of serious disabling injuries, although possible, is not very frequent either. The most usual outcomes of adverse ergonomic characteristics of work are many different types of not so dramatic disorders, frequently referred to as musculoskeletal disorders. They are the most commonly reported work-related illnesses in the working population [1, 2]. One of the few things that they all have in common is that they cause pain, and because of this they significantly affect the worker’s ability to perform a work and thus their productivity. Furthermore, the evidence shows that they have a huge impact on work-related absence and a high proportion of days lost all around the world. In summary, ergonomic-related disorders represent a considerable economic burden to employers, employees and to society as a whole [3-5] and therefore should be a major concern for industrial and production engineers.

The risk factors

Ergonomic-related disorders are connected to risk factors that include working conditions (postures and movements, repetitiveness, force required, vibration, temperature, etc.) and workplace design (tools and machines, dimensions, distances, etc.), but also individual factors such as age, gender, physical condition, etc. For example, the aging of the working population and its influence on the development of musculoskeletal disorders is a crucial aspect that should be taken into account in the near future.

Recent published works study the prevalence of musculoskeletal disorders among different occupational groups and sectors, especially office workers and health professionals [6-16], but this type of studies are seldom carried out in industrial sectors [17-19]. Other few works focus on specific risk factors [20-22] but the mechanisms of influence of many factors are still not well known.

Concluding Remarks

The existence of adequate ergonomic conditions is essential to guarantee an optimal performance of work and to preserve the most important asset of an enterprise: the human capital. The best way to achieve this is to implement ergonomic principles from design (of machines, production processes, management systems…), and there the industrial engineer acquires greater prominence.

On the other hand, there is a strong need for research in ergonomics, as the continuous changes in technology and production systems introduce new risk factors with still unknown effects on this type of disorders.

Taking all this into account, ergonomics should be included in the training of all industrial engineers, as ergonomic principles should accompany them along their whole professional life.

References


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