



RESEARCH ARTICLE

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## ERGONOMIC RISK ASSESSMENT IN FOOD INDUSTRY

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### ABSTRACT

The objective of this work was to discuss and explain issues related to ergonomic hazards in the food industry. Its development is justified by the high rate of occurrences of accidents at work in the sector. It is common to work in this area to deploy the safety of the product without emphasize the safety inherent in the processing. However, a safe food is the result of a series of steps that begins in the raw material and ends on the supermarket shelves, therefore, it is essential to look into this issue with a peripheral vision. Knowing the main problems and challenges faced in industries is the burden of food professional responsible for all stages of processing and customer service to market requirements, with security. It was concluded that the use of color in the safety signs, along with the efficient planning and monitoring of different spaces, are essential tools to decrease the risk of accidents at work.

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## INTRODUCTION

The intense competition among companies made that organizations realize the importance of employee participation in achieving their goals. Investing in technology is not enough, it is also necessary to invest in human capital, with qualification and good working conditions. Therefore, employees have significant influence on the quality of the products and the productivity of the company. Notes the importance of the use of ergonomics as a way of keeping the company in the market (FERREIRA, 2012). A work environment that is ergonomically appropriate to the employee and their needs makes you more productive and involved with the task that performs avoiding errors and reducing accidents. An adequate work environment is essential for the production is the best possible for both the employee and the company, for which it has no loss of time or damage caused by staff shortages due to health problems caused by failures related to ergonomics in the work environment (MONTEIRO, 2009).

The work is justified because it is vital that there is an adequacy of place of work to the professional, so that the environment becomes comfortable and safe. Should be avoided the risks of accidents and take measures that can have a positive impact on the productivity of the company. The care linked to hygiene and control of the product should be used in the food industry and this must also occur in relation to the health and safety of workers. The attention to ergonomics in the food industry should be very rigid, because it has to be considered the life of foods, the risk from contamination by microorganisms, among other factors, these industries can be found a number of factors, which pose a risk to the worker as, for example, noise, lighting, temperature, humidity, purity and air velocity, physical effort, type of clothing, among others. The service supply is characterized by an intense work, in which is required of officials high productivity in limited time. This productive structure combines activities strictly manuals with automated processes, however, most of the time it is held in inadequate conditions, leading to tiredness, dissatisfaction,

the fall in productivity, health problems and accidents at work. Thus, it has been, for issue of the project, the following question: How to evaluate the ergonomic hazards existing in the food industry and propose improvements to eliminate them or reduce them?

The methodology that was used for the construction of this study is the literature, since it is a theoretical-conceptual work, in which the matter will be researched bibliograficamente in other papers, articles, books, documents, among others. Among the elements that form the set of processes necessary to achieve the purposes of research are the bibliographical research, descriptive, historical and documentary. Second Cervo, Bervian and da Silva (2007, p.61), the bibliographical research "constitutes the basic procedure for the monographic studies, by which to search the area of the state of the art on a given topic."

### **About the ergonomics and its applications**

Second Grandjean (1998) "the word ergonomics comes from the Greek: *ergon* = work and *nomos* = legislation, standards. Briefly, the ergonomics can be defined as the science of configuration of tools, machinery and work environment. The target is the adequacy of the working conditions of the capacities and realities of the person who works. To wisner (1987), the ergonomics is based on knowledge in the field of human sciences (anthropometry, physiology, psychology, economics) with their results translated into technical device (art of engineering or architecture). Noulin already (1992, p.25) notes that the objective of ergonomics is to contribute to the design or the transformation of work situations, both with respect to their technical aspects such as the organizational partner, so that the work can be carried out respecting the health and safety of men and with the maximum comfort and efficiency. The ergonomics is differentiated from other areas of knowledge by its characteristic interdisciplinary and by its nature applied, i.e., the adaptation of the work station and the environment to the characteristics and needs of the worker (Dul *et al.*, 1995). Second IIDA (1993) the ergonomics is "the study of the relationship between the man and his work, the equipment (machinery), environment and application of knowledge of anatomy, engineering, physiology, sociology, and psychology in the solution of the problems that have arisen in this relationship". According to Spinelli and Abreu (2007), it is observed often in the food industries, greater productivity requirement in limited time, however, many times the working conditions are limited, with ergonomic problems in operational areas or even in the performance of tasks. Already Hagg (1998) mentions that in the food industry, are found numerous adverse conditions in terms of ergonomics. Especially in slaughterhouses, fridges and industrial kitchens, are found activities with high rates of repetition, use of excessive force, awkward postures and environments with low temperatures, causing major problems. This evaluation is important, because it directs the efforts for the jobs most impacted by the ergonomic risks, guiding the actions and outlining the design guidelines to be applied in these jobs.

### **The importance of ergonomics in the food industry**

The food industry has been stressing over the past decades, representing a significant share of national GDP. The demand for processed foods has increased substantially both internally and externally to the country. According to data from the

Brazilian Food Processors Association (ABIA), the United States occupied in 2010 the seventh position among the main world exporters of food in which refers only to processed foods. In this context, it has also featured in the generation of new jobs. On the other hand, is one of the main sectors with emphasis in number of accidents at work in the country. According to data from the Social Welfare Statistical Yearbook (2012), referring to the number of fatalities and accidents at work recorded throughout the national territory, in the sector of economic activity, industrial processing industry presents significant numbers, representing 31.31% of the total, among whom 7.72% relate to the industry of food products (REVISED PROTECTION, 2014). The decrease in the number of accidents at work is of interest of the owners of the companies and also the public bodies, this year the Ministry of Labor and Employment published a document entitled "National Strategy for the reduction of accidents at work 2015-2016" with the objective of presenting the specific plan of action of the ministry for reduction of accidents at work in the country and, thus, contribute to the reduction of damage caused to workers, businesses and the budget of the European Union. Work accidents are considered any type of lesion and/or disturbance to the health, being serious or not, that a person suffers while performs activities related to their work or employment. The same stem from inadequate interactions between the worker, the activity performed and the work environment, and may be caused by: risk behavior of the operator, by the inadequacies of the job, poorly designed products or failures of machines, in addition to factors in the environment (FERREIRA *et al.*, 2012). As regards the prevention of accidents must be attentive to the minimisation of risks caused by chemical, physical, biological, mechanical and ergonomic through measures that act, preventing and eliminating signaling them (SILVA AND ANDRADE, 2001). These measures must meet the risk management policies of each company from a set of actions ordered to identify, assess, measure and modify the possibility of occurrence of episodes with negative impacts, keeping the risks associated to the organization below the values tolerated (FERREIRA *et al.*, 2012; OLIVEIRA and ROCHA, 2014).

According to Rodrigues and Santana (2010), a striking feature of the food sector is the limited time of production that involves the performance of repetitive activities and requiring a lot of attention, causing the workers wear, both physical and emotional and psychological. Among the principal risks observed in the industrial environment are related to machinery and equipment in use (mechanical risks) which denotes a need to invest more in safety at work in this direction (Padovani, 2009). The ergonomic risks are linked to the implementation of tasks, the organization and the labor relations, to intense physical effort, lifting and manual transport of weight, inappropriate furniture, incorrect postures, rigid control of time to productivity, the imposition of excessive rhythms, work in day and night shift, long working hours, monotony and repetitiveness. It also encompasses the psychosocial factors. Among them, the situations that cause stress and the interpersonal relationship between the worker and his coworkers or managers. The main injuries observed in the food industry: pressing and dragging of parts of the body, sharp lesions on hands and arms, electric shocks, burns caused by steam, hot water and chemicals, among others, being that the majority of these involve machinery and equipment in use (SESI, 2008). Job security inherent in the most diverse sectors, affects the set of measures taken in order to prevent and/or

minimise workplace accidents and ensure the integrity of the worker. When it comes to machinery and equipment in use NR-12 (Regulatory Norm no. 12) and its annexes "define technical references, fundamental principles and protective measures to ensure the health and physical integrity of employees and establishes minimum requirements for the prevention of accidents and diseases of work in phases of design and use of machines and equipment of all kinds, and also the manufacture, importation, marketing, exposure and transfer any title, in all economic activities (...)" (BRASIL, 1978). The taking of preventive measures is the main tool to minimize the high numbers of accidents in food industries as well as in other industries. Taking into account all the equipment involved in the process and their main characteristics as: dimensions, weight and area needed for use, the demarcations, in addition to contributing to a suitable physical arrangement with clarity of the flow, comfort to the employees, etc. also ensures greater security, not only for the operators of such equipment, but also to the other officials who pass on the factory floor.

### Final considerations

This study explored the ergonomic risk assessment in the food industry. The literature review addressed information on ergonomics and the application of ergonomics and the importance of ergonomics in the food industry. As can be observed throughout the work, through the revision of the relevant bibliography about the theme, the ergonomics is quite extensive, being considered as a science that encompasses, since its origin, several distinct areas of knowledge, aiming at a perfect match of work to man. In the context of the food industry, there is still a long way to go by companies, through the application of ergonomic analysis of work and other tools available to ensure that these environments are constructed as correctly as possible, from the point of view of ergonomics. It was also observed reasons that make some industries seek for management systems, and the benefits that these companies

enjoy due to application of quality tools, such as greater organization and financial growth. This study explored information concerning the importance, barriers and benefits in the deployment of quality tools and can be used as a first step in a more in-depth study, applying these quality tools in companies that do not use and making more detailed follow-up of the items mentioned in this article.

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