

## TECHNOLOGICAL ERGONOMIC INNOVATIONS APPLIED AT THE FINAL SECTOR OF AN AUTOMOTIVE INDUSTRY ASSEMBLY LINE

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### Abstract

The trim shop, final phase of an automotive assembly line, has more direct intervention of workers than the previous productive sectors, and this factor increases the occupational risk number. These harm the employee's health and hinder the activities performance, consequences that could be prevented with the application of ergonomics concepts. This project consisted in a systematic review of recent publications about the technological innovations with ergonomics approach, which are becoming the workers's quality life better and optimizing the assembly line, like exoskeletons, motion sensors and virtual simulations.

### Key words:

*Ergonomy, Automotive Industry, Technological Innovations*

### Introduction

Due to its importance, the automotive sector is indispensable to countries economic development, whose multinationals are in constant rhythm of innovation and productive activities control (MATIAS-PEREIRA, 2010).

On it production line, there is the trim shop sector, where all the finishing pieces are fit in the bodywork. This phase has more direct intervention of workers to find and correct the possible mistakes of the previous sectors, witch might increase the accident chances like lesions, musculoskeletal disorders and occupational stress (RIBEIRO, 2013).

The occupational risks can be avoided with the introduction of the ergonomic concepts, which are responsible for worker's technique improvement, equipment damages costs reduction and production problems prevention.

Known as a field of study that evaluates the employee in his real work place, the ergonomic, in its physical focus, analyze the human anatomy, like body posture and repetitive movements (MATTOS, 2015).

Leaning on statistics that prove the high accidents index on the brazilian automotive sector, this study is characterized as a theoretical research, referred to a review of recent publications of articles collection about technological innovations with ergonomic approach, which are providing to employees better work conditions.

### Results and Discussion

In reflecting the ergonomic innovations in automotive assembly lines, this research integrates on Fourth Industry Revolution. In this context, the Fiat Chrysler Automobiles (FCA) relates ergonomic practices with the industrial modernization practices, because the search for solutions to improve the employee's work quality is an inherent challenge in the practices of Industry 4.0. There are many initiatives to improve ergonomic conditions, highlighting the exoskeletons as the most recent innovation that was adopted (SPADA et al., 2017).

The equipment is light and accompanies the collaborator movements in absolute synchrony, with aim of providing support and helping in activities that demand much physical effort. With an investment of \$80 million, it retires muscle fatigue and physical wears, at the same time providing more comfort and agility (CAPUTO, 2017).

Another featured is the virtual reality, which is already in *Ford Motor Company* and *Volkswagen* unities in Brazil to simulate, anticipate and analyze future work stations. The

system allows the mapping of efforts, reaches and other worker physical demands, in order to correct or annul the possible overloads (MASSOLINO; CRISPINO, 2017).

Through virtual simulates, FMC is using mannequins that are adaptable in extreme conditions, which represent the workers in the trim shop. This permits to study their movements and calculate the necessary force for each one of them (MASSOLINO; CRISPINO, 2017).

To reduce the costs, Volkswagen is using the motion sensor Kinect, a game technology that permits the data collection through real human motion, saving time while making sure that the data is objective and represents the movements of real users (BEETZEN, 2015).

### Conclusions

Innovative Technologies are in constant improvement to compose the "smart factory", sets out with Fourth Industry Revolution molds. With the stakeholders integration in business and value processes, this perfect industry model is characterized by adaption capacity, resource efficiency and by the concerning with ergonomic in workplace. It will be through the manufacturing computerization and the cyber-systems that new ergonomic evaluation tools could be developed, and these ones will improve the studies in this area ensuring, consequently, a better quality life to trim shop employees.

### Acknowledgement

I am grateful for the support of Mackenzie Presbyterian University and to my advisor Prof. Mariana Zuliani Theodoro de Lima.

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