Thermal evaluation in a production line of a Brazilian refrigerator on the ergonomic point of view

Wemerton Luis EVANGELISTA; Laureilton José Almeida BORGES; Willian Charles de LIMA.

Production Engineering Student - Instituto Federal Minas Gerais (IFMG) campus Bambuí. Rod.Bambuí/Medeiros km 5. CEP: 38900-000. Bambuí-MG, BRAZIL

1Production Engineering Student - Instituto Federal Minas Gerais (IFMG) campus Bambuí. Rod.Bambuí/Medeiros km 5. CEP: 38900-000. Bambuí-MG, BRAZIL

2Professors – IFMG.

Keywords: slaughterhouse; ergonomics; thermal environment.

1. Introduction
Currently, the number of companies concerned with the health and workers' welfare is increasing more and more. Many companies require that when there is a change or the creation of a new production line, their jobs are ergonomically correct, ensuring good working conditions for employees.

Workers of the slaughter industry, highlighted the pig sector, are exposed to a constant temperature variation and it can cause several health disorders. Thus, the application of the concepts of ergonomics in companies of this sector is of great value as it can assist in maximizing the working conditions.

This study aimed to carry out a thermal analysis in a production line of a typical slaughter plant of the Brazilian pig industry, under the ergonomic point of view. Among the environmental factors, we focused on the thermal environment, because of the high complaint rate of the employees to constant exposure to temperature variation, especially by those workers in the receiving sectors and slaughter (dirty and clean zone).

2. Methods
This work is characterized as a case study, in which it is performed an ergonomic analysis focusing on the factors of the thermal environment of a pig slaughterhouse. A case study is conceptualized as an empirical research that seeks to analyze a real and current event, comparing and relating the reality to the context of theoretical definitions (Yin, 1989).

In pigs receiving and slaughter sectors, since they have higher temperatures, we used the Wet Bulb Globe Temperature Index and (WBGT) to evaluate the environment thermally as recommended by the NR 15 (BRAZIL, 1978).

3. Results
Among the slaughter plant sectors, it was evaluated, in relation to environmental thermal conditions, only the sectors of receipt and slaughter (dirty and clean zone), since these have a very high number of complaints of discomfort by the employees.

At the reception of pigs, according to Brazil (1978), the NR 15 states that temperature should be 26.7 °C for this type of environment and the measured WBGT was 24 +/- 1,5, below the established limit.

At slaughter sector (dirty area), three different environments were analyzed because the work stations were located far away from each other. All WBGT values for the activities of the slaughter sector (dirty area) remained above the values limited by NR 15. Among all monitored stations, the activity of pig general scraping had the highest rate, at 30 +/- 1 ° C. This was due to its proximity to the scorching machine and the tank (where the pigs are immersed after being bled).

In the slaughter sector (clean area) as it was not seen a significant difference in temperatures of work stations and all activities monitored were classified as heavy, the analysis presented the average results. The WBGT in this sector remained above 25 ° C set by the standard, and its value of 30 +/- 1 ° C.
According to the authors Gallois (2002), Carvalho (2009) and Takeda (2010), who also analyzed ergonomically Brazilian slaughterhouses, employees of this type of corporation in general are exposed to temperature changes harmful to health. It is therefore necessary that the slaughterhouses deploy more efficient temperature control mechanisms, allowing to reach the ideal temperatures for each type of environment and provide a better welfare for workers.

4. Conclusion

Through the analysis based on on-site observation, is found the need for the company's attention to the temperature control of the receiving sector, as in the days that the temperature is higher is very necessary to trigger the attenuators providing greater convenience to workers and animals.

In the slaughter sector, there was an excessive heat in their work environments and the presence of a few hoods and fans. According to the workers' claims, it is recommended to conduct a study of these temperature minimization mechanisms to provide greater well-being to them. Among the WBGT index measured in this sector, the highest value recorded was 30 +/- 1 °C relating to pig general scraping activities (dirty area) and slaughter (clean area).

5. Acknowledgment

We thank all publications used as the basis for preparation of this paper and the Minas Gerais State Research Foundation (FAPEMIG) for the funding of this publication.

References


