Analysis of the Causes of Labor Accidents in a Steel Industry in Southern Santa Catarina

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Abstract

Over the years, manufacturing industries such as the steel industry have shown a significant increase in their productivity, this growth highlights themes that make up the development framework of this segment. In this context, there is a concern with the preservation of the employee's integrity, generating a state of alert for the risks existing in the production process, and the preventive measures that organizations must put in place to eliminate or minimize these risks, avoiding accidents. For the development of this project, occupational accidents are characterized as those that occur at the service of the company causing bodily injury with temporary leave of the employee. This type of accident is referred to as a typical accident, as they are caused within the work environment and must consider all aspects related to work, such as: the machinery, the task, the environment, the instruction for carrying out the activity and the organization of the work. job. This study aimed to analyze the causes of accidents at work in a steel industry in the south of Santa Catarina, identifying the influencing factors in the causes of accidents, characterizing the types of accidents at work, highlighting the productive sectors and the frequency with which these events occur , indicating possible improvements in the development of work activities. Accident data were collected and analyzed over a 10-year period, demonstrating the nature of the injuries and the agents involved in order to make it possible to reduce the occurrences of accidents in the analyzed productive sectors.

Keywords: Labor activities; Integrity; Scratchs; Accident.

1. Introduction

The current world is in constant technological changes that has been incorporating the industrialization

process. All this advancement has made the industrial sector very competitive and has shown that relations between employees and companies go beyond the exchange between workforce and reward. In addition to financial commitments, it involves quality of life and work, promoting the preservation of man, the environment, society and the company.

One of the major indicators of economic development in a country is the production of steel, as the consumption of this material indicates a growth in other industrial segments that directly contribute to the country's economic and social turnover.

The need to provide adequate conditions for the exercise of all activities within the organization, preventing accidents, leads companies to work with the issue of safety in a comprehensive and effective way, enabling the management, prevention and control of accident risks in work environments. work and labor activities of the productive sectors of society.

The present study has as its theme the analysis of the causes of occupational accidents in a steel industry in the south of Santa Catarina, such choice is justified by the importance of identifying the causes involved in occupational accidents, in this company, in order to indicate possible improvements in the development of productive activities.

The method used started from a qualitative research, with quantitative aspects and documentary analysis, in order to characterize the groups of the sectors and their exposure to the risks of accidents specific to the activities performed.

Until the middle of the 20th century, there was no real concern with working conditions, even if this was directly linked to the risks of illness or even the death of workers, the most important was productivity. This concept was guided by an ideal that the value of human life was little more than negligible, added to a total neglect on the part of the states in creating laws that would protect the worker.

Over the years, the Federal Constitution started to guarantee workers various rights, giving scope to others that aim to improve the social condition of the worker.

This new scope gave rise to the creation of regulatory standards that enforce fundamental rights and guarantee the reduction of risks characteristic of work, through health, hygiene and safety standards.

The employer must aim above all to prevent accidents and damage to health, arising from work, seeking to eliminate or reduce risks in the workplace.

The study aimed to identify the influencing factors in the causes of occupational accidents involving employees of a steel industry in the south of Santa Catarina, classifying the types of accidents that occur in this industry, indicating possible improvements in the work environment or in the organization of individual activities or collective from the detection of the found thrusters.

The possibility of accidents in the steel industry has become increasingly significant due to the increase in production, highlighting the need for work organization, as well as the definition of stage controls to ensure the protection of workers.

It is important to emphasize that health and safety measures at work are the responsibility of the employer and the employee, since in order to be successful it is necessary to have the participation of both, thus guaranteeing the efficiency in combating and preventing accidents, eliminating the financial costs for the employer, and society.

2. Methodology

The study was divided into two stages. The first consisted of reading and reviewing the literature, part of which was inserted in the theoretical reference section, where the essential theories and concepts that served as the basis for the development of this study were exposed.

The study was carried out in a steel industry located in the extreme south of Santa Catarina, specialized in the production of parts in iron and steel alloys for the agricultural and mining sectors.

The industry has a staff of one hundred and eighty-five employees and a monthly production of two hundred tons, and of the total number of employees, only one hundred and forty-five are characterized as direct labor, the rest are classified as labor. indirect work or support sectors, such as the engineering, commercial, shipping and other sectors.

The second stage of the study began with a documentary analysis of the accident records that occurred between the years 2008 to 2018. The study included employees who were victims of occupational accidents characterized as typical accidents, who have an internal record of the accident occurring and who remained away from their work activities for a period equal to or greater than fifteen days.

To collect the data extracted from the accident records, a classificatory instrument was elaborated containing the following variables: name of the employee, number of the internal record of the accident at work, date of occurrence, place / area of work, period of absence and the classification of the employee. accident.

The study carried out is a qualitative research with quantitative, descriptive and longitudinal aspects. For the development of the project, bibliographic research was carried out. The data collected for the research had documentary origin, consulted in the work accident investigations filed in the company's occupational safety sector.

Descriptive statistics will be used for the analysis and characterization of the main variables presented with relative frequency. For this, the collected data will be displayed in an Excel spreadsheet, where the types of accidents, the causes of the accident, the agents involved and the injured part of the body will be demonstrated, thus making it possible to classify the accidents that occurred in the company during the period of 2008 to 2018.

3. Data collection and analysis procedure

To initiate the study, a documentary analysis of the accident records that occurred between the years 2008 to 2018 was carried out. Employees who were victims of occupational accidents characterized as typical accidents, who had an internal record of the occurrence of the accident, were considered part of the study. they remained away from their work activities for a period equal to or greater than fifteen days.

In the first selection of accident records made available for the study, 14 records marked as uninjured were excluded, as they caused only material damage to the company, 8 accident records characterized as commuting accidents, and 19 records for having less than 15 days' absence time . In this context of the 156 available records, 115 were considered part of the study and 41 were excluded because they did not meet the established criteria.

Accident records were filed in physical format, so the information collected was made available in an

Excel spreadsheet containing the following variables: name of the employee, number of the internal accident record at work, date of occurrence, place / work area , period of absence and accident classification.

The determination of the place / work area was given as follows: Molding, includes the sectors of modeling, machining, closing and molding, cold curing, light and heavy; Fusion, includes the sectors of scrap, furnace and demoulding; Finishing, includes the sectors of heat treatment, welding, eschareador, jet, press and deburring; machining; and dispatch that includes the quality control sector.

The accident classification variable was divided as follows: types of accidents; causes of accidents, subdivided into personal factor, unsafe act and unsafe condition; agents; and finally the injured body part.

It is important to note that for the identification of the injured body part, the personal consequence described in the accident investigation form completed by the occupational safety technician of the company where the study was conducted was considered.

The occurrences were classified in the variable accident classification based on the description of the accident that occurred together with the pre-established reasons.

After collecting and classifying data, it was necessary to identify the number of accidents recorded per year. The records used as the object of study were divided to perform the calculation of the total number of occurrences by sector and their percentage representation. In this stage, the overall average of occurrences and days of leave was also calculated.

The data were used to identify the most common types of accidents in the company's environment, the agents, the causes involved and the injured body part.

4. Analysis of results

It can be seen, in figure 1, that the highest rate of accidents with lost time occurred in 2009, 14 (12.17%) accidents with lost time greater than 15 days were recorded.

Significant indices were also recorded in the years 2011, 2012 and 2018, where each presented 12 (10.43%) of the selected records, followed by the years 2014 and 2015 with records of 11 (9.57%) leaves, the year 2008 with 10 (8.70%), the years 2010 and 2013 with 9 (7.83%), the year 2017 with 8 (6.96%) and finally the year 2016 with 7 (6, 09%) accident records, showing a total of 115 accidents that were used as the object of study.

These numbers showed an average amount of 10.45 accident records per year and an average value for the period of absence of 63 days.

Figure 1: Shows the number of registered employees with more than 15 days' leave from 2008 to 2018
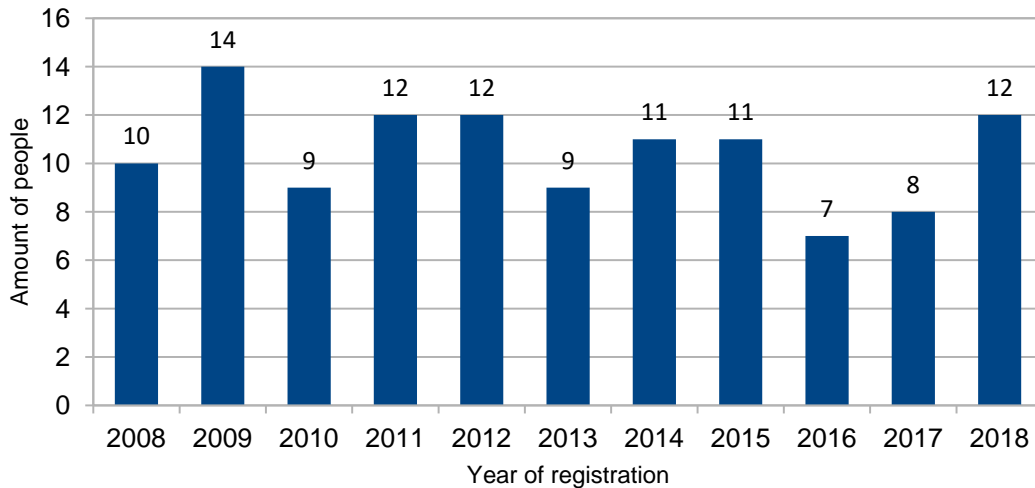
Source: Authors

Figure 2 represents the distribution of accidents by sector, where it is possible to verify that the highest number of accidents occurred was predominantly in the finishing sector, which represents 54.03% (61) of registered accidents.

The molding sector appeared in second place representing 16.52% (19), followed by the melting and machining sectors, where each represented 12.17% (14), and finally the shipping sector, which represented 6.09% (7) of recorded accidents.

Based on graph 2, the data displayed were presented by productive sector highlighting the types, causes, main agents and injured body parts, considering the total records made for each one.

The causes recorded in the occurrences were subdivided into 3 types, these are: Personal factor, unsafe act and unsafe condition.

Based on the results presented by the productive sector, the general classification was also performed, unifying the data of the sectors.
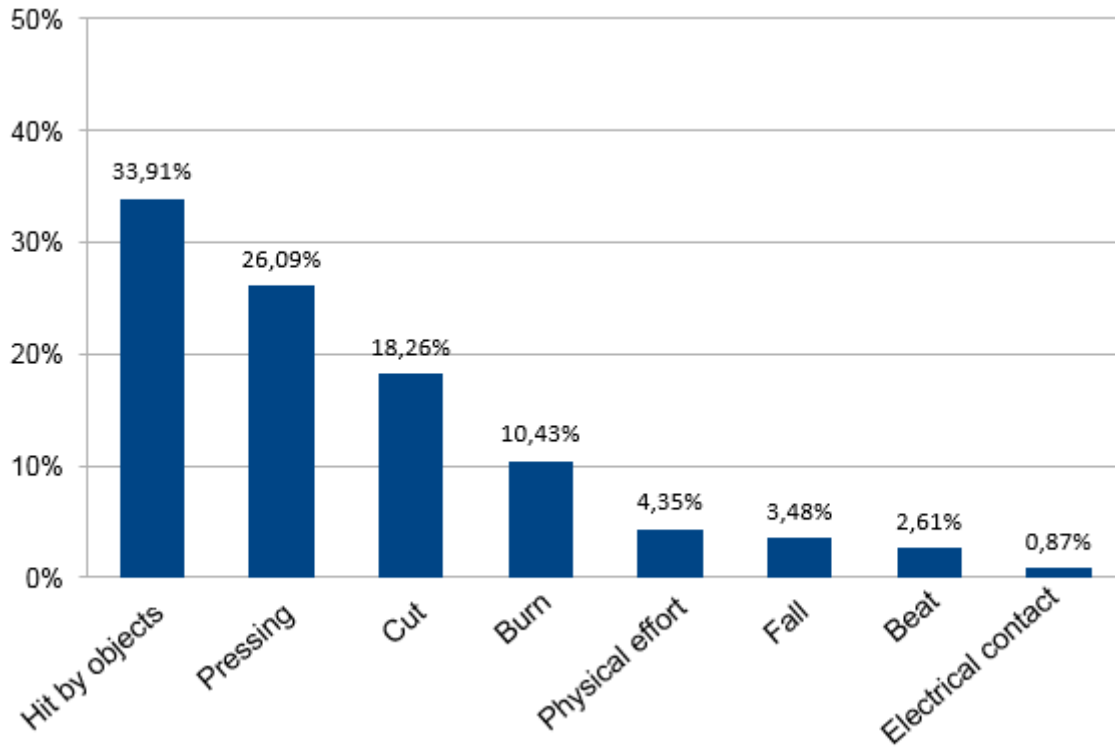
Figure 2: Percentage representation of accidents by sector in the 10-year period
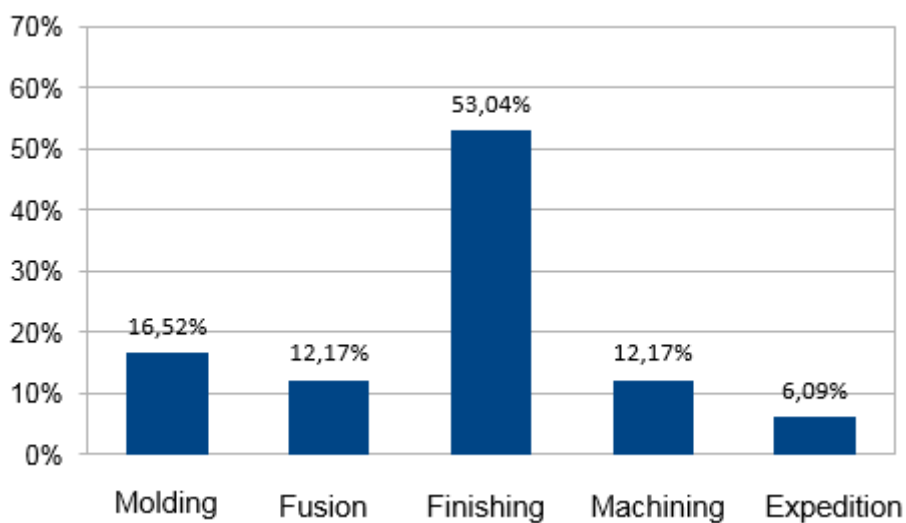
Source: Authors

Through figure 3, it is possible to see that the highest rate recorded in the occurrences refers to the cases in which employees were hit by objects, parts or materials resulting from the production process. This type of occurrence represented 33.91% of the 115 records used as the object of study, that is, about 39 employees were removed from their activities due to this event.

Figure 3: General classification by type of recorded occurrence

Source: Authors

Figure 4 shows the percentage representation of each of the subdivisions, where the highest index was represented by the variable unsafe condition which represents 47.83% (55) of the recorded occurrences, it is worth mentioning that the variable unsafe act has a very close value, 41.74% (48), which makes it the second highest index of records, last but not least, is the variable personal factor, which was represented by 10.43% (12) of occurrences.
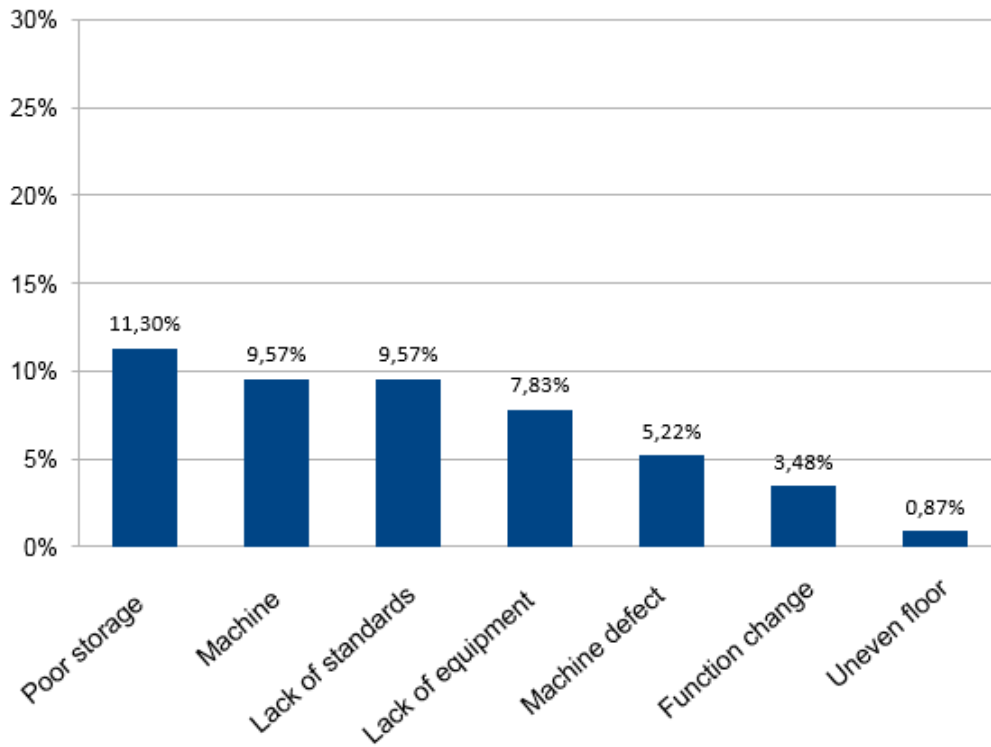
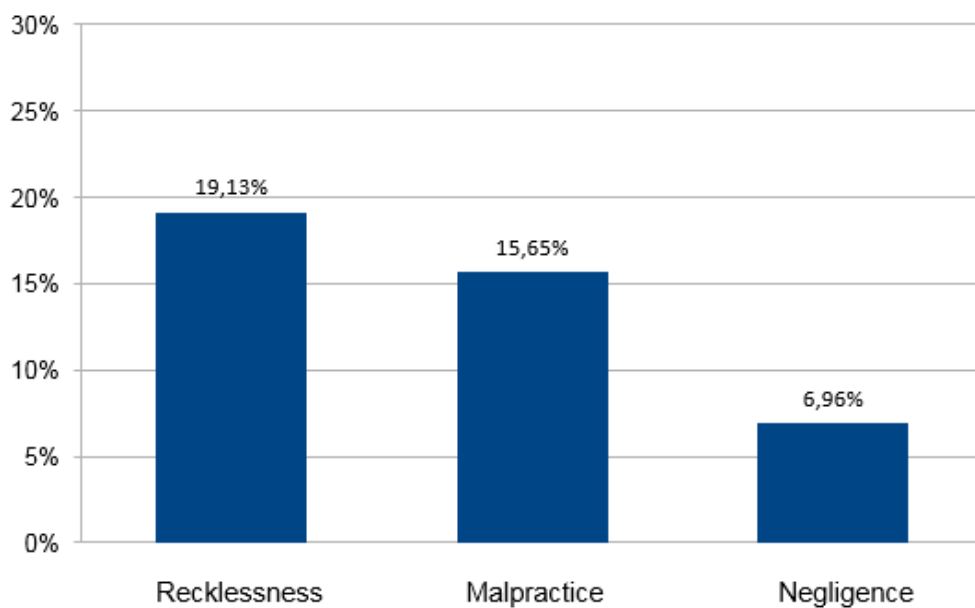Figure 4: General classification for cause recorded in the occurrence
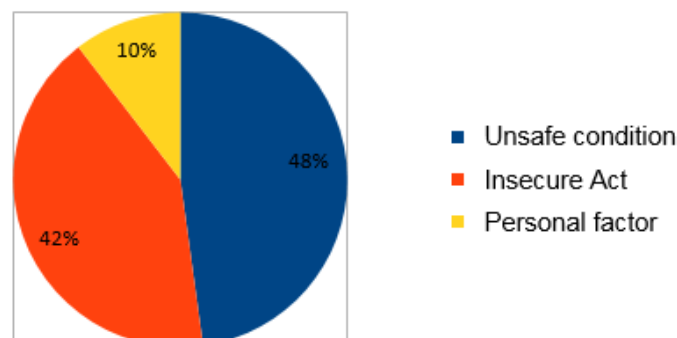
Source: Authors

The three variables represented were stratified and framed in pre-established reasons, as shown in figures 5, 6 and 7.

Figure 5: General classification for cause recorded in the occurrence as an unsafe condition
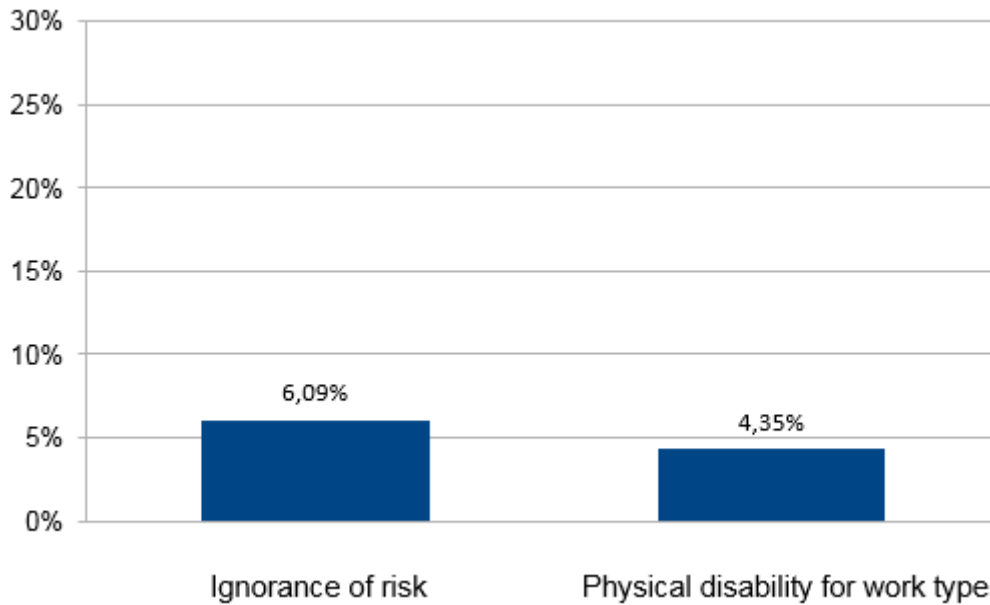

Source: Authors

Figure 6: General classification for cause recorded in the occurrence as an unsafe act
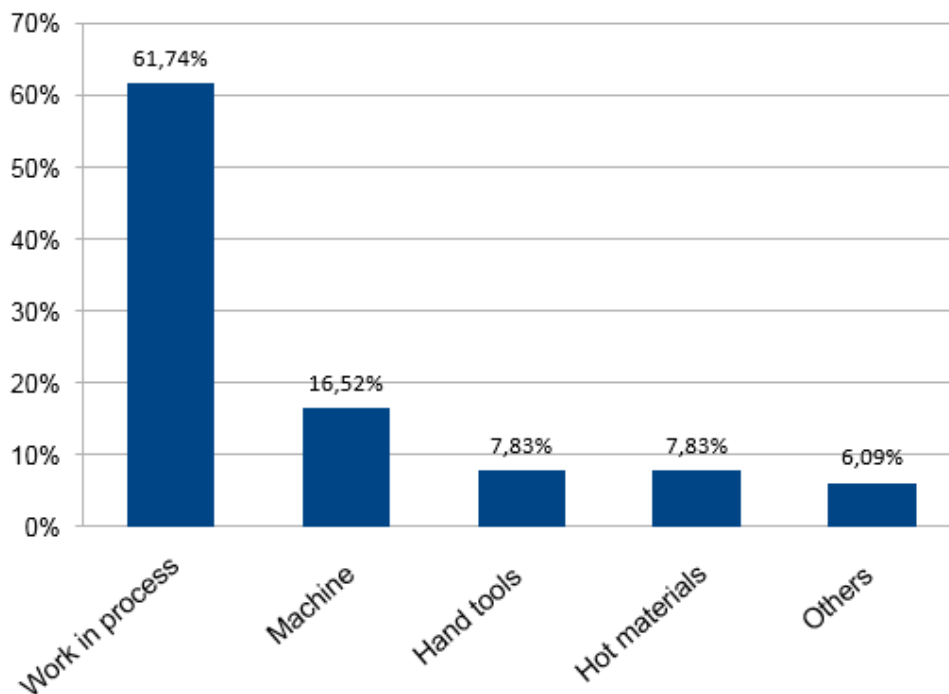

Source: Authors

Figure 7: General classification for cause recorded in the occurrence as a personal factor

Source: Authors

Given the registered causes, the third point assessed was the agents involved in the analyzed events.

Figure 8: General classification by agent registered in the occurrence
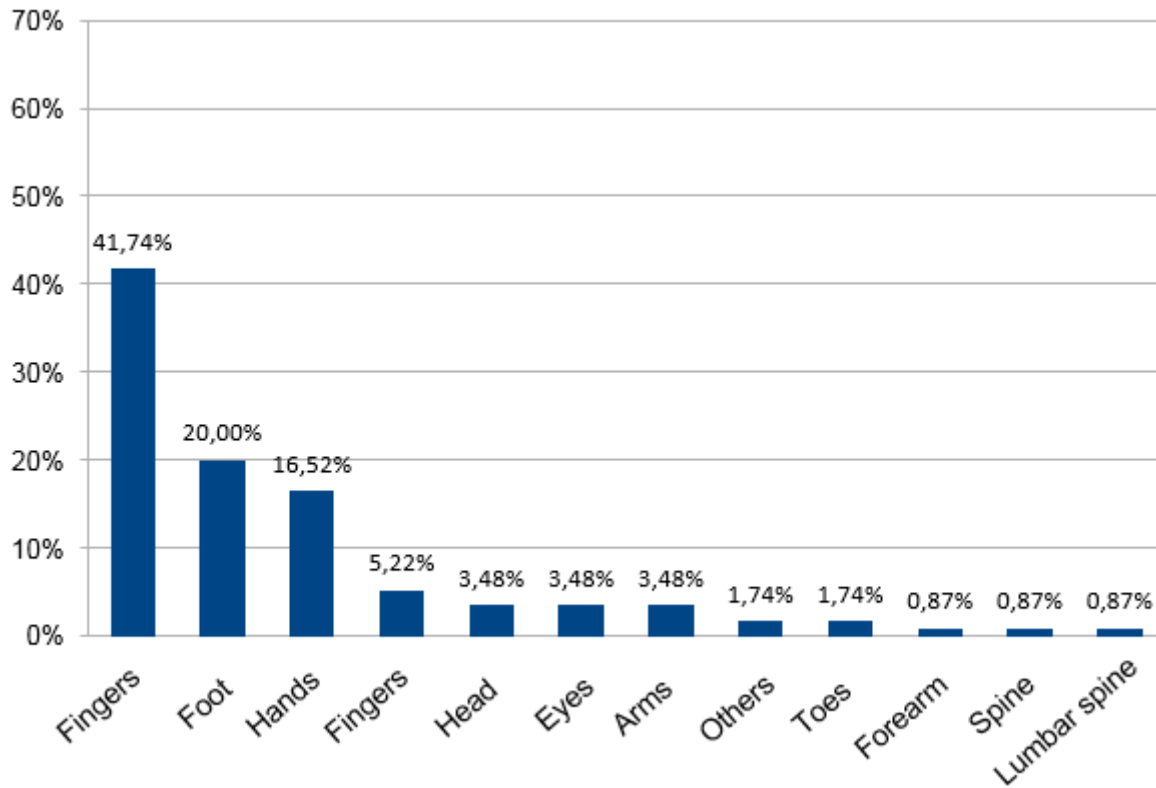

Source: Authors

Each registered occurrence has a specific type of agent, figure 8 shows the agents involved in the analyzed records, here it is possible to verify that just like figure 3, the highest percentage (61.74%) found is also related to parts and materials resulting of the production process.

Due to the wide variety of agents found, those that represented a percentage value less than 2, were classified as "others". These are: Hoisting equipment; Buildings; Pressure vessels; Chemicals and furniture.

Figure 9: General classification by the injured body part recorded in the occurrence

Source: Authors

It can be seen in figure 9 that the most affected part of the body, based on the recorded occurrences, was the fingers, which represents that 41.74% (48) of the employees were temporarily removed from their work activities.

The injured body parts indicated as "others" are those that the record made in the investigation of the accident had more than one personal consequence.

5. Conclusion

In the classification of occupational accidents that occurred in the period between the beginning of 2008 and the end of 2018, it was found that the highest accident occurrence rate was in the finishing sector, representing 53.04% (61) of the 115 records used as object of study, this sector had an average period of 60 days away from employees from their work activities. It was identified as the main type the accident whose employee was hit by an object, part or material of the process, in the general classification this type of accident represented 33.91% (39), followed by pressing by / between object, part or material that represented 26.09% (30) of the records.

Among the causes, the highest index was registered as an unsafe condition 47.83% (55), within this it was evidenced the poor storage, lack of space or poor stacking 11.30% (13), which is directly linked to the

physical structure of the company, since, over the years, there was a significant change in the production process, which resulted in increased demand and made the space available for the small process. As it is a civilian area, the company had nowhere to expand and today is looking for new facilities.

The agent with the highest recorded rate 61.74% (71) was part or material in process. This agent is directly linked to the type of accident, in this case it is possible to notice that the sum of the highest rates recorded in the type of accident, presents a value very close to that represented by the causative agent.

The main part of the body affected was the fingers of the hands, which in the general distribution represented 41.74% (48) of the absences. Even with the great technological advancement, some productive tasks in this branch are still very manual and depend on the direct participation of the employee, mainly in the finishing sector, which in the case of this study had the highest rate of occurrences in the period.

These results demonstrate a need to reorganize the company's physical arrangement and pay special attention to the handling and handling of parts in the process, as in the results presented in the causes of accidents it is possible to notice that the unsafe act factor also has a very significant index 41,74 % (48), within this the biggest cause was recklessness 19.13% (22), in this case the company understands that the employee performs the activities without the necessary preventive measures, increasing the risk of an accident occurring.

In order to determine the execution of the activity, the company needs to ensure that the information is clear to the employee, therefore, at this point it is necessary to develop work instructions, which will describe the correct way of carrying out the task, training, monitoring and charging for compliance with the necessary preventive measures for the performance of the activity, which when correctly performed minimize the employee's exposure to the risk of an accident.

The health and safety of the employee must be considered as a strategic point in the development and growth of the company. The biggest challenge is to encourage the company and the employee to understand that in addition to the legal obligation, establishing and taking preventive actions for the execution of activities is a commitment to productivity and increased profits for the company, and for the employee it is about quality of life and mainly survival.

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