Analysis in materials management processes: case study of the metallurgical production line of Company in Goiás

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Abstract

Great is the importance of the application of management tools in the context of materials management and its effectiveness highlights the impacts it causes on the production processes of industrial organizations. The objective of the research is analyzing points in the production line in aluminum frames "Practical" that generates lack of done products at the moment of the loading. It is believed that there is a lack of monitoring of the safety stock during the processes. Regarding the methodological section, a case study will examine the use of techniques and methods in the composition of the field research in Haiala Metallurgical Company. The traditional case study investigation strategy is applied in order to understand the unit of analysis as the essence of the case in investigation, focusing on the organization's productive process as a unit of analysis as a determinant of this research project. The operational process of stock market has a high weight in the production; it must be treated with targeted investments in the sector, as in the training of professionals, as in the processes and systems that will gain time in qualifying and quality of products and services. According to the data obtained, the researchers reported the possibility of any flaws relationed with the production line, resupply time of the feedstock in the working point and turnover. It was concluded that the lack of the finished product was due to the lack of an accurate production planning.

Keywords: management materials; production planning; strategy production;

1. Introduction

At the beginning of the twentieth century, from Taylor and Fayol, new forms of administrative management were created that led to other directions, with management focused on large-scale production, in order to develop the product sequentially, where each one produces a certain part until the final result. During this same period there was a study on human behavior to better harness the potential of each employee. Reflecting on the materials management process, one realizes how important it is for organizations to be working on methods and tools based on classical concepts, from a fundamentally control perspective, aiming at the least waste in order to obtain a satisfactory result.

The importance of the application of management tools in the context of materials management shows the seriousness with the process impacts the industrial organizations, knowing that it is from the materials management that the whole production process begins, resulting in a good product. quality and adding value to the final product. Well-structured materials management provides competitive advantages through cost savings, reduced inventory investments, improved purchasing conditions through negotiations with suppliers, and customer and consumer satisfaction with the products offered. by the company (GONÇALVES, 2007; HOSSEINI, 2015).

The interior of a company is invariably the scene of a series of actions applied to the materials or information that enter the production process to be gradually transformed until they result in final products or services rendered. In the long journey through the companies, the materials go through a sequence of steps through a series of machines and equipment along the productive sections, until, finally, it reaches its final result as products or services (GONÇALVES, 2007; DIAS, 2009; LIM et al., 2010; HOSSEINI, 2015).

According to the new directions of Materials Management it can be conceptualized and studied as an Integrated System in which several own subsystems interact to form an organized whole. It is intended to provide the management of the necessary resources to supply materials that are indispensable to the functioning of the organization, complementing the objective, therefore, is to optimize the investment, increasing the efficient use. financial resources, minimizing the capital needs invested in inventories (DIAS, 2009; YANTI et al., 2013; TULVINSCHI, 2015).

The relevance of the work is that it allowed to contribute to materials management and production line in the studied organization "Haiala Metallurgical", collaborating with overwhelming information to aid a better productivity. Considering that the materials management and production line sector is quite wide, allowing its opening and deepening, it also clarifies that there is a vast field to be explored within the research, from new strategies directed to the use of materials and greater productivity, to industry efficiency, always seeking customer satisfaction.

The problem addressed in this research converges the investigation regarding the lack of finished product "Practical Line" at the time of shipment of sales, failing to meet the delivery time, impacting the planning and discomfort with commitment made between seller and end consumer. The implementation of production planning based on the continuous approach is a recurring practice in a dynamic environment (CHAND et al., 2002) and applied by both academia and industry (SAMPAIO et al., 2017). It is of utmost importance to focus on this issue in order to understand the organizational problem regarding the process of sourcing production materials. The research in question sought information about materials management

tools and processes, focusing on the production of windows of the "Practical line in the Haiala Metallurgical industry", aiming to identify in the processes and internal controls, the cause of the lack of finished product at the moment of loading.

2. Methodology

The procedures applied in the present research were based on technical evidence from direct observation and applied interviews, converging field research into the observation of facts as they occur in reality (FACHIN, 2006, p.29).

A case study aims to understand the unit of analysis as the essence of the case under investigation, in which it can be understood as an event, an entity type or some process modality (ROSSI, 2004: 99). The unit of analysis is critical in determining whether the research project will adopt the traditional case study or multiple case study. Yin (2015) points out that the most important thing when choosing case studies is to apply replication logic rather than sampling.

This case study used documentary research, conducted from private, original and non-transferable Haiala Metallurgical archives, and interviews were conducted with managing director, inventory supervisor, production supervisor, human resources supervisor and collaborators.

This general source material is useful not only for bringing knowledge that serve as background to the field of interest, but also to avoid possible duplication and/or unnecessary effort; It may also suggest problems and hypotheses and guide other sources of collection. Questionnaires were also applied in addition to direct observation along the shop floor processes.

It is observed that the direct documentation and data collection were of fundamental importance for the efficiency of the conclusion of a work, but also the application of indirect research, which indicates the collection of data in a documentary and bibliographic way of interest. According to Lakatos and Marconi (2009, p. 176) "the indirect documentation technique is done in two ways: documentary research and bibliographic research". The production supply methods and techniques and their production strategy were the focus of data collection for information from the Material Management and Processes of the Practical production line used in Haiala Metallurgical, in order to strengthen the proposed investigation.

It can be observed that in the search for understanding, it was essential in the field visit before the approach of the processes and services developed for the construction of this article, the participation of the person in charge of the production sector, in which he had an effective participation, demonstrating knowledge and dedication. He described all the steps of the production process of the Haiala Metallurgical Practical line, making a significant contribution to the accurate and detailed information within the visit.

3. Results and analysis

The organizational structure of the studied company is composed of several departments starting with the administrative center and the productive process sectors. Production lines are divided into specific and flexible lines, steel products have their production divided by specific models, where only one model of each product is concentrated in the production line, this form is only possible due to the large warehouse planned for support the large-scale production flow, the aluminum line has the differential of being flexible,

where various product models are developed on the same production line, adapting according to the product to be produced, the physical space is in expansion process so that specific lines are created in order to expand production due to new market trends.

3.1 The space for inventory management

In the collection of data obtained according to interview with Galvão (2014), production supervisor, it was found that the material inventory consisted of products classified as A, B and C as; Steel coils, locks, inks, and various profiles, composing the steel line products in a total of 190 items. Already the raw material of the aluminum line consisted of products "A, B and C, such as profiles, glass, obtaining the aluminum products that together add up to a total of 153 items, totaling 340 items in aluminum and steel."

The organization had an area in the industrial sector of Quirinópolis, with space in the yard for trucks, area for handling cargo and unloading, area built to house the administrative center, large industrial shed, designed to serve all sectors, from the warehouse of raw material, refectory, passing through the production lines, painting, until the finished product stock. The total area, including loading and unloading space as well as parking, is 21,000 m², which incorporates a total built area of 12,924.50 m², and within this space is the aluminum production sector that includes the “Plena” and “ Practical ”, with a space of 1,446.30 m² and already planned to expand the sector (SANTOS, 2014).

3.2 Inventory management operation

According to field research and data extracted from the applied interviews, it was identified that the structural process of the material management operation began by receiving the raw material, checking and storing the material according to its classification and needs. They are stored in strategic locations in order to follow logistics to better serve the departments. For material retirement, the form of open stock is adopted, in which it is directly discharged, using the fact sheet, when the production order is passed, the system itself searches the fact sheet that contains all the items. that are spent for the production of the product, at that moment it is made low through the system, the leftovers of cuts and burrs of holes, are weighed and made the manual low (GALVÃO, 2014).

According to data collected, both in the raw material and accessories, the stock replacement was made through the technique of determination of minimum and maximum stock, delimiting the replacement time from the moment of equalization of the minimum stock, was also verified as to stock replenishment according to its control tools, developed by the Information Technology (IT) sector, where the order of the raw material is triggered from the entry of orders from customers that exceed the limit stock, at this time an automatic e-mail alerting inventory consumption pre-booked by orders that have just entered the commercial sector (GALVÃO, 2014).

The organization worked with open stock, that is, the material write-off occurs when the Production Planning and Control (PCP) launched the production order, the system recognized the required quantity through the fact sheet, where all the items were registered in the system. items used for each product produced, and automatically occurred as requested. There were also cuts left in the production process that were collected and weighed, thus being lowered from the total weight (GALVÃO, 2014).

There was no specific employee to monitor the safety stock, the control was performed through the

PCP, in which the aluminum frames were duly inventoried fortnightly and subsequently analyzed their lead time. The form used was the rotating inventory, according to the organization's schedule was done fortnightly, always on the first business day of the month and on the first business day of the second fortnight, for the finished products were made monthly, as the raw material and accessories, always on the first business day of the month (PALMEIRA, 2014). The organization of the operation and its proper inventory management provides an optimization of resources (LIM et al., 2010), especially financial which is healthy, in this perspective it is clear that the integrated CFP becomes essential for an industrial organization (TULVINSCHI, 2015).

3.3 Production process of the Practical line

With the data collected in the field research, Galvão (2014) explains about the realization of the production process in the Practical line, starting with the production order, following for cutting and machining, later consulted. the technical data sheet and drawings, proceeding the next day the assembly of components and then the joining of parts, closing and adjustment was done ending with the inspection and packaging. The daily production reached 70 total aluminum pieces between Practical and Plena line, this production tended to grow with the expansion of the new space that was being developed, intending to reach 250 pieces per day to serve the market, according to the new project. sales under development.

3.4 Cutting waste and its impact on remuneration

According to Palmeira (2014), the company, aiming to avoid waste and improve inventory control, adopted the policy of benefits to employees directly involved in production, where the measurement of cutting waste impacts on the final salary, when these exceed the allowable limit, that is, in front of a weighting table established by the company itself, there was a permissible limit for them, when it was exceeded, the employees of the sector lose the bonus, and consequently, they no longer receive this benefit, which was added to the final remuneration (Figure 1). When production planning is not performed for the entire planning horizon, but only for a few periods or only one period, huge waste of resources occurs (HOSSEINI, 2015; SAMPAIO et al., 2017).

Figure 1. Waste deposits of the production process

3.5 Sales impacting the lack of finished product

The aluminum window and door line was launched in 20l2, “Full Line”, being more sophisticated, directed to a higher purchasing power audience, while the Practical line was launched. later, also with a

formidable quality, aimed at a middle-class public, however failures emerged during the process, facing a market still under construction, in which the Practice frame line exceeded sales expectations, causing delays in sales. deliveries due to low production flow (PALMEIRA, 2014).

The problem was identified when orders started to come in at this time as planning failure begins to appear, because with the variety of products in the Practical line it was necessary to adjust the templates as requests to produce, having to stop other productions so that the same physical space is used, and this process has been causing delays in deliveries and consequently lack of product at the time of loading (PALMEIRA, 2014).

Organizations to serve their customers and maintain their competitiveness must possess the means of production that include various resources and capabilities, and these purchasing decisions include spatial, temporal and productive location aspects (JAKUBOVSKIS, 2017). The fault was identified, and a project was planned to expand the physical space and improve the sector's productivity (PALMEIRA, 2014).

3.6 The production process

During a field visit to Haiala Metallurgical, several steps were raised for the production of the Practical line, which began by receiving and checking the raw material, coding according to the date of receipt, which was later made. a separation according to the expected amount of average spent in the last 3 months, and the sending for chemical bath process and painting to be performed by specialized companies located in Brasilia and Goiania, with return time of 15 days (GALVÃO, 2014).

When the goods arrived, a second measurement conference was made to verify the conformity of the service performed, since the product was already in a specific profile to assemble the Practical and Full line, and then the items were separated by means of From the production order issued by the PCP, the production process later began by cutting the profiles and moving to another phase in which holes and cut-outs were made to be screwed and fitted.

Soon a new separation and preparation for mounting with the sealing fittings was made, moving to the frame, following for adjustment, then to the template where the functionality tests are made, not being conformed again to correct the faults. Being in compliance was made the final quality inspection starting for packaging and mooring and ending with the palletization of finished product (PA) (GALVÃO, 2014).

3.7 Process analysis

According to the collected data it can be inferred that the lack of the finished product is due to the delivery time of the processed raw material, since the acquired one arrives at the company in its form fresh after 90 days from the beginning. having to go through two other processes of chemical treatment and painting of aluminum profiles to start the production process, on the other hand suffers from a growing demand in the aluminum sector, not being fully prepared for meet the flow (Figure 2).

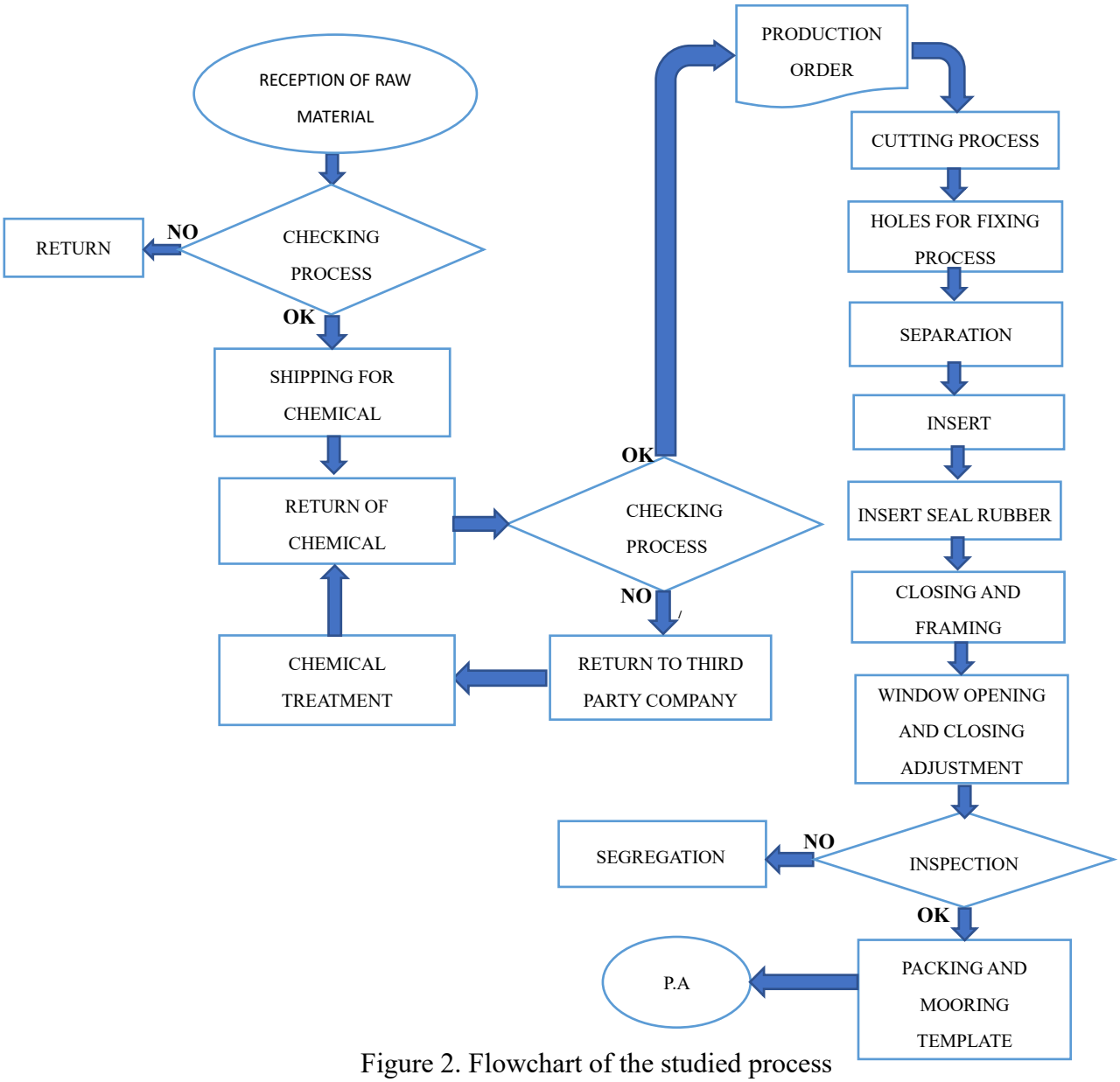

Figure 2. Flowchart of the studied process

So that there was manufacturing goods and services, there was always the need to process raw materials that would be transformed into finished products or services throughout the production process, in its first step with regard to the application of the raw material in natura takes 90 days to reach the company, due to its cut and exclusive measures for the organization. However, it was found that this was not the critical point as there was sufficient stock to meet demand, but in chemical treatment processes where it was separated by quantity and measures to be sent to the partner organization for treatment. chemical and paint for corrosion protection.

On average, the time taken for this process was 15 days, on its return was held a new conference and measurement is in compliance follows the production process, non-compliance leads to return to redo the process (PALMEIRA, 2014), impacting directly in the delivery of the finished product (KUMAR & AOUAM, 2018). Regarding the amount of raw material to be sent for chemical treatment and painting, it was found that it was based on the analysis of sales over the past three months and may vary from sporadic orders with high quantity out of forecast, resulting in scarcity of the raw material to be used (Figure 3).

Performance of production systems is strongly affected long before capacity is fully available, increasing average delivery time in a nonlinear manner (SAMPAIO et al., 2017).

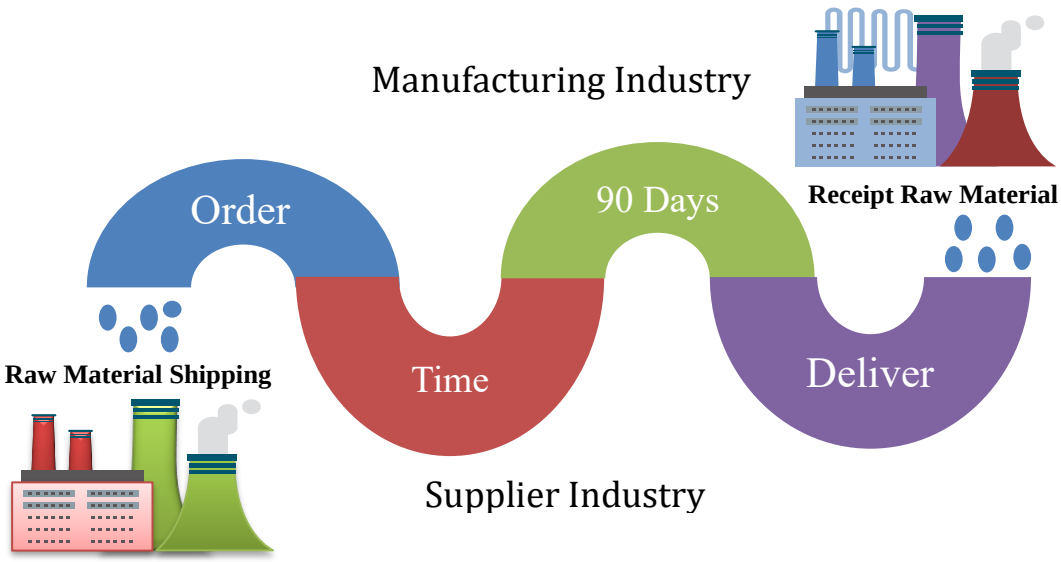

Figure 3. Raw material supply process

To plan and monitor the production system to keep it always dynamic, healthy and fluent, the PCP needed to gather data and information from all parties. Data and information must be gathered to provide an integrated approach to operation and the entire system, particularly where their bottlenecks or bottlenecks were located (KUMAR & AOUAM, 2018). For effective production planning, it is necessary to keep up-to-date information on demand estimates, estimates of production capacity, estimates of available resources, among others, in order to provide the action horizon, which is important for successful planning. and control of current production (CHAND et al., 2002; SAMPAIO et al., 2017).

Another identified bottleneck was the turnover of employees, losing professionals already with an advanced technical level of the production line, it is inferred that this fact was due to the high demand of the workforce. The ambiguity between people's expectations of the job and what the organization feels should be done causes uncertainty about what the role of the employee should be and this type of problem can be the result of a poor understanding of what is expected and also provoke the turnover (GUIMARÃES, 1998; FERNANDES & ROSA, 2013). With this, one must also consider the time demand for qualification and training of new employees to perform the function (PALMEIRA, 2014).

One of the aggravating factors that was also a reason for lost productivity was the lack of physical space for the Practical production line, since several models were developed in the same space, “flexible production lines”, wasting time in exchange and jig setting. The PCP has its efficiency reduced due to the adopted production model and directly impacts the productivity in the production line (CHAND et al., 2002; SAMPAIO et al., 2017).

4. Conclusion

In an analysis made in relation to field research, it was found that an aggravating point was the lack

of monitoring of market demand, that there was no history that could compare product demand in the same period of previous years, only stated It is concluded that the sale of this product was a trend for significant growth in the market. Based on this information, it is concluded that the lack of the finished product was due to the lack of an accurate production planning and control method impacted by the seasonality of demand in certain markets. periods that did not have an adequate forecasting equation.

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