REVISTA DE EMPREENDEDORISMO E GESTÃO
DE MICRO E PEQUENAS EMPRESAS

EDITORA ENTERPRISING

STOCK MANAGEMENT WITH THE USE OF KANBAN IN A METALMECHANICAL COMPANY OF SERRA GAÚCHA

STOCK MANAGEMENT USING THE KANBAN IN A METALMECHANICAL COMPANY OF SERRA GAÚCHA

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RESUME

Inventory management is a widely addressed issue both in the academic and organizational environment. Through efficient management in the organizational scope, bring improvements to cost reduction, provide efficiency in productive planning and assist in decision making. In this sense, the present work addressed what benefits a company in the metallurgical sector can obtain due to an adequate inventory management model. To this end, a case study was carried out in a large company, analyzing the implementation of a Kanban pilot (Just in time), to identify opportunities for competitive gains, using as methodology a qualitative exploratory research, which was implemented through the development of the case study, with individual in-depth interviews, with a semi-structured approach. After the implementation of the study, significant changes occurred, such as: reduction of stock, reduction of storage space, more accurate information and decreasing the resources invested with the fixed assets in inventories, this allowed the company a new form of inventory management. It was found that large investments were not necessary to achieve satisfactory results, improving reliability, stock organization, agility, freeing up physical space and financial resources. Demonstrating the benefits of using this tool. It was found that large investments were not necessary to achieve satisfactory results, improving reliability, stock organization, agility, freeing up physical space and financial resources. Demonstrating the benefits of using this tool. It was found that large investments were not necessary to achieve satisfactory results, improving reliability, stock organization, agility, freeing up physical space and financial resources. Demonstrating the benefits of using this tool.

Key words: Management. Stocks. Costs. Productivity. Kanban.

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Slim, AD, Craco, T., Biegelmeyer, UH, Camargo, ME, Zanella, T .; Stock Management Using Kanban in a Metalworking Company in Serra Gaúcha.Magazine of Entrepreneurship and Management of Micro and Small Enterprises V.5, Nº3, p.132-151, Sep / Dez. 2020. Article received on 11/15/2020. Last version received in 12/18/2020. Approved on 12/28/2020.

1. INTRODUCTION

Inventory management is widely addressed both in the academic and organizational environment (ROSA; MEYERLE; GONÇALVES, 2010). An efficient stock management can bring significant improvements in the administration of organizations, since it makes it possible to improve the efficiency of the production planning, bring greater security in decision making, in addition to having greater control to fulfill orders (FERNANDES, 2010). Wanke (2011) complements that other factors contribute to greater concern with inventory management, referring to the high cost of capital opportunity, which impact the financial indicators by which companies are evaluated.

Therefore, inventory management is formed by a set of decisions with the intention of controlling the dimensions of space and time, observing the characteristics of the product, the operation and the demand, so that the objectives, cost and level of specific services (WANKE, 2011). And that some questions must be taken into account, such as: how much to keep in stocks, how much and when to order (NAMIT; CHEN, 1999; SILVA, 2009, CIPRIANI, et al., 2015).

In this way, the most appropriate choice of the inventory management model, goes through an empirical decision, using simulations, which may involve analysis of scenarios and additional costs (SILVA, 2009; ROSA; MAYERLE; GONÇALVES, 2010).

Accordingly, this work has the general objective of investigating the implementation of the Kanban system in a company in the metallurgical sector of the Serra Gaúcha. The research question that will guide this work is: what benefits can a company in the metallurgical sector obtain from the Kanban system?

To achieve this general objective, the following specific objectives are presented:

- Identify the current situation of the organization, with regard to inventory management;
- Implement Kanban;
- Analyze the results obtained with the proposed model.

2 THEORETICAL FRAMEWORK

2.1 STOCK MANAGEMENT

Currently, inventory management has been a constant concern of companies, especially in organizations that manufacture numerous items in their production lines. These companies use technology to manage their stocks and thereby reduce losses, streamline processes internally and increase their own revenue (AYRES, 2009).

In line with this, inventories exist to regularize the existing processes in companies, where they organize their production through the existing control over the sales of products existing in their inventories, seeking with this, to have a physical and financial balance of the organization, in the insofar as it has the possibility of providing products with the maximum agility possible for its customers, optimizing deliveries and contributing to retain existing customers and win new customers for the company (AYRES, 2009).

Therefore, companies' inventories must be well managed so that they do not suffer from delivery delays, product shortages, production deficiency, products with high prices and loss of customers to the competition.

For this, it is necessary that the inventory management administration knows how to answer: (i) how much to order: every order must specify the quantity required, based on expected future demands, supply restrictions, existing discounts and costs involved; (ii) when to order: the exact time to issue a new order is determined by the order point parameter, which depends on the lead time to replenish expected demand and the desired service level; (iii) inventory levels can often be revised: continuously or periodically, depending on the technology present and the revision costs, among other factors; and (iv) how to control the system: the use of performance indicators and the monitoring of operations must be present to support corrective measures (BIEGELMEYER, et al., 2015).

Another relevant aspect refers to the costs that are determined through a series of factors that contribute to them being more expensive or less expensive for companies (ARNOLD, 1999). Among the most diverse inventory costs, we can mention the following:

- Cost per Item: refers to the price paid for an item purchased, it consists of its own cost plus other costs related to it, such as, for example, transportation, customs fees and insurance. Inclusive cost is often referred to as the destination price. When the item is manufactured in the company, direct labor, direct material and indirect manufacturing costs are included (ARNOLD, 1999);
- Storage Costs: any and all storage of material generates certain costs, which are: (i) interest; (ii) depreciation; (iii) rent; (iv) handling equipment; (v) deterioration; (vi) obsolescence; (vii) insurance; (viii) wages and (ix) conservation (DIAS, 1993),
- Out-of-Stock Costs: Depleting inventory can be potentially costly due to the costs of missed orders, lost sales and possibly lost customers. Inventory shortages can be reduced by maintaining extra stock for certain products where replacement by suppliers is somewhat critical, thus seeking to protect the company from those occasions when demand is greater than expected (ARNOLD, 1999).

It is noticed that the stock has several costs and they must be minimized in the best possible way, as this way companies can place their products on the market at more competitive prices.

In this context, the traditional inventory management model, with maintenance of high inventories to meet future demands, where production is done in standard size batches, there is no relationship with the real demand from customers, thus adding unnecessary costs and not bringing the necessary flexibility that the current scenario demands, in contrast to this model we have Just in Time, which seeks to meet the needs of internal and external customers without adding costs and with the necessary flexibility.

2.2 STOCK MANAGEMENT MODEL

2.2.1 Model *Just In Time*

The Just in Time system, hereinafter referred to as JIT, started in the 1950s, in Japan, at the Toyota Motors Company, in order to increase productivity, despite limited resources (MOURA; BANZATO, 1994).

The terminology, according to Shingo (1996), does not focus solely on the issue of delivery time, since it could encourage the early production of unnecessary items. Therefore, each process must be supplied with the necessary items, in the necessary quantity, at the necessary time, that is, at the right time, without generating stock.

This implies that, in a productive flow, the correct parts necessary for assembly reach the assembly line at the time that they will be needed and only in the necessary quantities, with that an organization that fully establishes this flow can reach zero its stocks, which from the point of view. from the point of view of production it is the ideal state (OHNO, 1997).

So Just in time aims to meet the demand instantly, with quality and without waste, providing an effective management of productive costs, an efficient production in terms of cost, in the necessary quantity, at the right time and in the right places, using the minimum of resources (CHING, 2007).

And so, JIT corresponds to produce goods and services at the exact moment of need, and not in advance to build stocks, and not afterwards, thus making your customers have to wait. In addition to this question of time, efficiency and quality needs can be added. Possibly it could be the definition of JIT: it seeks to meet the demand instantly, without waste and with perfect quality (SLACK; CHAMBERS; JOHNSTPON, 2002, p. 482).

In summary, Just In Time, aims to improve productivity globally with a disciplined approach, aimed at eliminating waste. With the possibility of an efficient production in terms of cost, also with the correct supply of place, time and quantity, minimizing the use of human resources, facilities, equipment and materials. JIT depends on the balance of user and supplier flexibility, achieved through teamwork and total employee involvement. The basic premise of JIT is simplification (SLACK; CHAMBERS; JOHNSTON, 2002).

Accordingly, JIT requires high performance in all production objectives: (i) quality must be high, as production problems due to quality failures will reduce the flow of materials, affecting the internal reliability of supplies, in addition to generate the formation of stocks, if errors reduce the production rate; (ii) speed, in terms of the rapid flow of materials, is fundamental if the intention is to meet customer demands with production, and not for inventories; (iii) reliability is a prerequisite for fast flow because it is very difficult to achieve fast flow, if the supply is not reliable; and (iv) flexibility is essentially important so that small batches can be produced with short lead times and reaching fast flows. (SLACK; CHAMBERS; JOHNSTON, 2002, p. 484).

Thus, it can be concluded that JIT is a production system linked to make to order (under order). And that it is an "added value activity for the organization as it identifies and attacks fundamental problems and bottlenecks; loss and waste; it eliminates complex processes and implements systems and procedures "(CHING, 2007, p. 39). With the objective of "achieving high volume production, using minimum stocks of raw materials, intermediate stock and finished goods" (DAVIS; AQUILANO; CHASE, 2001, p. 407).

JIT uses a simple system, called Kanban, to remove parts in process from one workstation and pull them to the next station in the production process. The manufactured or processed parts are kept in repositories and only some of these repositories are supplied to the subsequent station. When all the repositories are full, the machine stops producing, until another empty repository returns, which functions as a "production order". Thus, inventories of products in process are limited to those available in the repositories and are only supplied when necessary (OHNO, 1997).

Therefore, Kanban is a method that authorizes the production and movement of materials in the JIT system. In the Japanese language the word Kanban means a marker (card, sign, plaque or other device) used to control work orders in a sequential process (LAUGENI; MARTINS, 1999).

The Kanban System is an instrument of production control. It has the function of a production order in the manufacturing department and the function of withdrawal instructions in the subsequent process. Only something will be produced according to a production program communicated by the production control department. The Kanban system has the function of notifying the first, that the parts are being made, if these parts are necessary (MOURA, 2003).

To make production feasible, one must work in sync with demand. This means that production is "pulled" by demand, that is, a process produces the number of parts that the next process used, restoring the previous part level (MOURA, 2003).

As a result, three requirements are needed to facilitate this production process, according to Shingo (1996): (i) standardization of work: it allows the necessary quantity of products to be produced in one time; (ii) efficient combination of products, machines and personnel; (iii) process design or machine layout: process design refers to changes in functional layout for production cells, made possible by the existence of multifunctional operators and (iv) production synchronization: in synchronized production, variations in demand are answered more easily due to great efforts in reducing tool and batch change times.

Based on the vision of Shingo (1996), the Toyota Production System is the elimination of losses and its main function is planning, that is, the cycle of organization, control, execution and inspection in which products with defects must not pass through. following processes, and there should be total elimination of losses whenever possible.

2.2.2 Traditional Model

The traditional model developed at the beginning of the industrial era, considering the particular environment of the time. With virtually infinite market demand and a lack of competitiveness, the company's profits were not determined by costs. The price determined the profit (Price = Cost + Profit). Quality was not the focus, the only concern was production volumes (SLACK; CHAMBERS; JOHNSTON, 2002).

Pushed production: this system is determined by the behavior of the market, called “push system”. With this model, the company's production occurs before demand occurs. Thus, it depends on an order previously sent, usually generated from an MRP system (Material Requirement Planning). Upon receipt of the order, production is carried out with standard size batches. Thus, there is no relationship with the real demand (FERNANDES; GODINHO FILHO, 2010).

The so-called continuous production flow does not interfere with this production model, being produced separately in each unit used in the process. Therefore, a production order is sent to the sector, which produces the items and then "pushes" them to the next productive stage of the process, called "pushed production". Controls of quantity, timing and what should be produced are carried out by MRP. (FERNANDES; GODINHO FILHO, 2010).

The MRP executes its operation producing standardized batches of products that are “pushed” into the following operations of the production processes, with no direct link between what is produced and the customer's real demand (TUBINO, 2000). And that allows, based on the master production schedule (MPS), to determine the type of item that should be produced, how much should be produced and at what time, as well as the materials to be purchased, how much should be purchase and when the need to use these materials will be. (FERNANDES; GODINHO FILHO, 2010). In which the objectives of the MRP system are: to promote production where there is no excess inventory, excess production in overtime, and production fluctuations (VOLLMANN et al., 2006).

Being a pushed production planning and control system that aims to meet the needs of materials through master planning, inventory control, the list of materials and the generation of production orders, during the 1970s and 1980s MRP became the most important system and later evolved to MRP II (Production Resource Planning), working in the areas of production, marketing and finance, with the last areas outside manufacturing (SLACK, 2002).

Although the MRP has several resources for the management of the PCP (production planning and control), in isolation it is a limited system to support different productive environments that present a high degree of complexity, in terms of detailed factory programming. In order to better deal with this difficulty, programming systems with limited capacity were developed, whose main characteristic is to consider the productive capacities of the productive system as well as its technological characteristics, as a restriction for programming decision making, aiming as a result , guarantee that the production program is feasible, that is, compatible with the available capacity (CORRÊA et al., 1997, p. 289).

3 METHODOLOGY

The present study used a qualitative exploratory research which, according to Gil (2012), the main purpose of exploratory research is to develop, clarify and modify concepts and ideas, with a view to formulating more precise problems or searchable hypotheses for further studies. . Of all types of research, these are the ones with the least rigidity in planning. They usually involve bibliographic and documentary surveys, non-standard interviews and case studies.

For Fachin (2001, p. 125), he says that, “bibliographic research constitutes the act of reading, selecting, recording, organizing and archiving topics of interest for the research in question. It is the basis for other research and it can be said that it is a constant in the life of those who intend to study ”.

Dencker (1998, p. 97) reiterates that the planning of qualitative research is complex, due to its diversity, flexibility and lack of precise rules to apply it in numerous cases.

In relation to case studies, they are in-depth studies of one or more objects, in order to allow a detailed knowledge of the subject. It aims to investigate a specific case, by seeking as much information as possible on the subject in question (GIL, 2008). And that consists of collecting information about a certain community, family, group or individual and analyzing them, in order to study various aspects of their lives, according to the research theme (ALMEIDA, 1996, p. 106).

Therefore, it is an empirical investigation, investigating a contemporary phenomenon within its context in real life, especially when the limits between the phenomenon and the context are not clearly defined (YIN, 2010, p. 39). Thus, the case study strategy is used to understand, in depth, a certain event, situation, process, project, in short, something that occurs in the real world.

So, sthe work will be developed using a single case study (YIN, 2010), using documentary research, reports made available by the company and the survey of documents. And, in addition to this, individual in-depth interviews (VERGARA, 2009).In the view of Schlüter (2005, p. 106), the interview can be used as a single instrument for data collection or to complement other techniques, and can be classified into structured and unstructured.

Structured interviews are uniform and rigid. The researcher has a list of questions that have to be asked in the same order and in the same terms. Unstructured interviews, in turn, consist of an unrestricted conversation between the researcher and the interviewee on topics related to the object of study (SCHÜTER, 2005).

The interviews will be conducted in a single session with each of the interviewees, lasting approximately 1 hour, in which they were recorded and later transcribed (FLICK, 2009). Subsequently for data analysis, content analysis was used (BARDIN, 2004).

Content analysis is characterized as a set of techniques used to perform the analysis of communications, such as transcripts, interviews, and others, and employs objective and systematic procedures to find the content of the message under analysis (MOZZATO; GRZYBOVSKI, 2011).

The data analysis technique adopted in this research was to interpret data with the material coding to aid construction and coding (GIBBS, 2008).

It will be used: (a) open coding, (b) axial coding and (c) selective coding The objective of open coding is to explain data and phenomena in the form of concepts, so a list of codes and categories should emerge as a result of coding (STRAUSS; CORBIN, 1990; GIBBS, 2008; FLICK, 2009). Axial coding is the process of relating the subcategories to a larger and broader category (STRAUSS; CORBIN, 1990; GIBBS, 2008; FLICK, 2009). Since, selective coding analyzes and refines the entire process identified in axial coding, with the objective of characterizing the central or essential category of the theory so thatother developed categories can be grouped and related (STRAUSS; CORBIN, 1990; FLICK, 2009).

Regarding the profile of the interviewees, it is sought to identify the people with decision-making power who can contribute with relevant information to add to the present study, however, some selection criteria were defined: time in the company, position held and knowledge in relation to issues to be addressed. Thus, the following professionals were identified, which will be presented in Chart 1:

Table 1 - Profile of respondents

Identification of Respondents	Interviewees' Position	Company Time
Interviewee A	Production coordinator	17 years
Interviewee B	Production coordinator.	34 years
Interviewee C	Production supervisor	10 years
Interviewee D	In charge of production	16 years
Interviewee E	Programming Supervisor	15 years

Source: Prepared by the authors (2020).

4 CASE STUDY

The study was applied in a company centenary Brazilian metallurgical company, headquartered in the city of Carlos Barbosa, Rio Grande do Sul, which produces knives (kitchen, professional, sports), pocket knives, scissors, skewers, cutlery for daily use, kitchen utensils and pots, non-stick forms and dishes aluminum.

Family business, with management that emphasizes quality, seeks to serve all classes of consumers, stands out on the national scene and exports to more than 120 countries with its own brand, employs more than 2 thousand employees, has an annual turnover of 1 billion real.

The aluminum sector produces aluminum pans, forms and non-stick platters, with vertical production, has a high level of industrial automation, starting with aluminum ingots through casting, lamination and profile cutting that become the final products. It is one of the company's newest sectors, with large investments. The sector has been structuring itself continuously, being the sector with the highest growth, already accounting for 40% of its revenue, thus having great representativeness in the company's business.

The stocks in this sector are aluminum coils, between stages of production that currently contain 2,000 tons, having a high financial value, being the most representative for the sector.

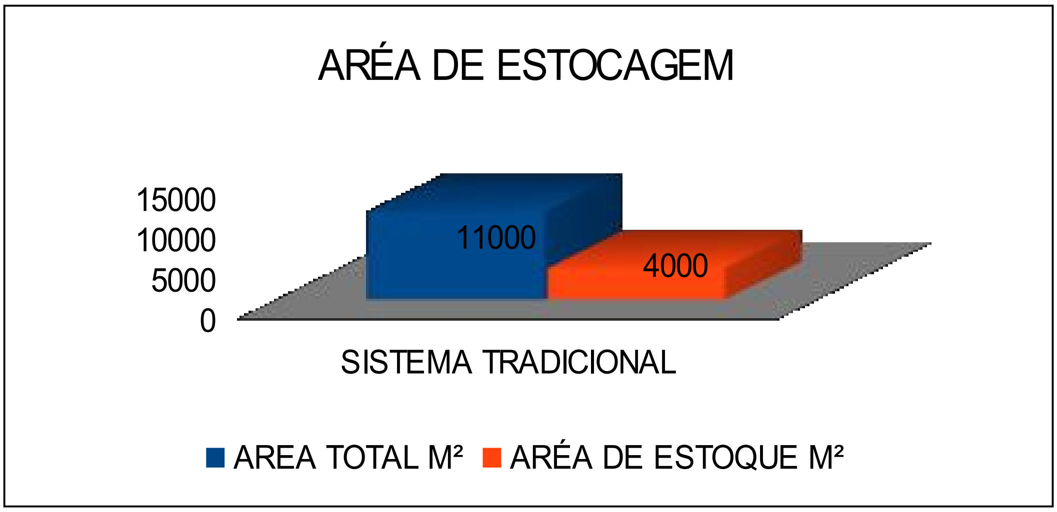
The survey was applied in the aluminum sector for the reason of having new processes, in which they are in full structuring and have significant levels of stock, thus facilitating the implementation of the proposed concepts, because until then, the company works with traditional concepts.

5 ANALYSIS OF RESULTS

5.1 ANALYSIS OF THE CURRENT SITUATION

In the sector of the company studied, the traditional aluminum coil stock system was used, where it had an average stock volume of 1,590 tons (R $ 15,500,000.00), it faced difficulty in storage space, where it occupied an area of 4,000m², within a total area of 11,000m². There were also products stored in different locations in the factory and in an unordered manner, thus making movement difficult and losing productive agility. We can identify in Figure 1 below the total area of the sector and the space used for storage.

Figure 1- Stock area occupied by the current system



Source: Prepared by the authors with information from the company studied (2020).

The values found in the graph in Figure 1 allow us to visualize the space used for storage in relation to the total area of the sector, where 36% of the total area for storage was used.

In line with this, it was observed thathigh clear and visible identification in order to facilitate the identification of the items in a practical way, because in addition to being deposited on the floor, they were on only one level, increasing the storage area. And so, there was the existence of products awaiting definition regarding the quality situation, such as test coils and samples from suppliers, thus contributing to the accumulation of materials and not transmitting stock reliability.

Therefore, according to the managers interviewed, this caused a high level of stock due to the lack of reliability of the products and the process. Thus, the organization to maintain productive balance, increased inventories as a way to ensure the supply of raw materials, even though precise information was lacking.

In this horizon, it is clear that the reasons for the use of the traditional method by this sector, were due to the need for immediate production and lack of history because it is a new process. However, the system required many manual controls, and unnecessary movement due to lack of organization, also made it difficult to locate for movement at the time of production, with loss of efficiency. This can be seen according to Interviewee B.

> [...] The previous system was very plastered, needed many controls and high stocks, with Kanban the opposite happened. In our model, where we work in an integrated manner with speed, product versatility and short delivery time, Kanban worked perfectly.

5.2 PROPOSAL OF THE KANBAN SYSTEM

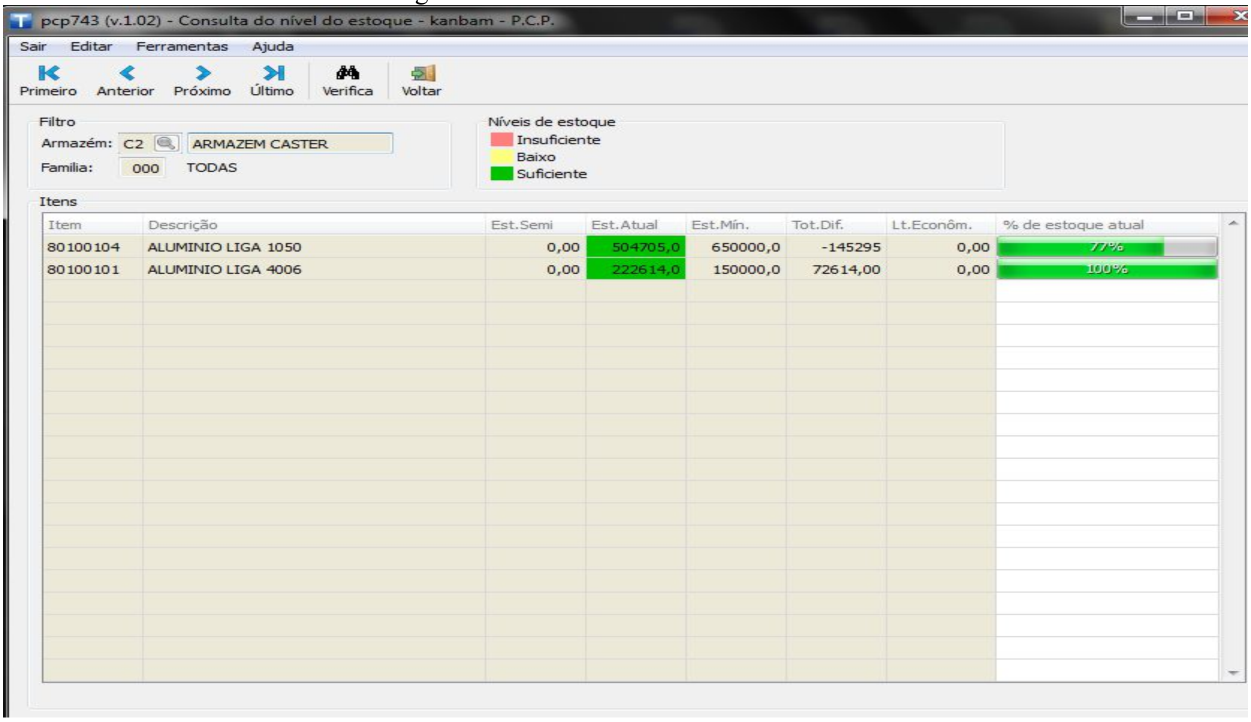
Kanban is a simple Just In Time system, to remove parts in process from a workstation and pull them to the next station in the production process and are kept in repositories. Thus, inventories of products in process are limited to those available in the repositories and are only supplied when necessary (OHNO, 1997).

This led to an assessment by the organization in relation to its losses, in which it was it is necessary to define the materials under analysis, as well as the destination of these materials that did not meet the desired quality level, eliminating unnecessary materials. The addressing of the coils was also reorganized, where a system was developed for positioning the coils on two levels, with the objective of optimizing the storage space.

To the same extent, a detailed assessment of the foundry's productive capacity (where aluminum coils are produced), counting preventive maintenance times and time spent on setup, seeking to maximize production efficiency.

Parallel to this, a computerized system was developed for this specific stock. And in this way to increase control and reliability of the Kanban system's inventory information, where it informs the level of inventory identifying the percentage as shown in Figure 2, implying greater control and reliability of the information, as well as practicality and agility.

Figure 2 - Aluminum stock information.



Source: Internal system of the studied company (2020).

In view of this, it is observed that the managers had the expectation of a greater harmony between inventory management and production, with greater control and reliability, reduction of inventory levels, greater organization and visibility for those who produce, increasing production agility. In this regard, Interviewee C pointed out that:

> [...] after the implementation of the Kanban system there is a greater control of the stock, information on the movement, entries and exits.

At the same time, it was also observed by the managers the low cost of implementing this inventory management tool, as reported by interviewee D:

> [...] in our specific case it was low cost.

Finally, this system change took place naturally and gradually, in which the organization first needed to know this concept, and only subsequently make the necessary changes (cultural and specific aspects such as: training of employees, investment in IT, etc.).

During this process, the organization presented difficulties in relation to: adapting to a new system in relation to the process, adapting people in relation to the use of the new system, commitment of those involved, reorganization of current stocks, identification of each item and elimination of non-used materials. fit for production.

5.3 RESULTS OBTAINED

In relation to the results expected by the managers through the interviews, the coding was followed as described by Flick (2009): open, axial and selective coding. In this sense, the following codes were created, as shown in Tables 2 and 3 below.

Table 2 - Benefits from implementing the Kanban system.

Open Coding	Axial Coding	Selective Coding
Gain of physical space		
Improvement in internal organization		
Easy materials localization	Structural advantages	
Reduction of stock levels		
Information security		
Cost reduction.		
Release of funds for cash flow.	Financial advantages	
Freeing up physical space.		
Greater control and credibility		Benefits of implementing the Kanban system.
Better production planning		
Easy programming		
Greater efficiency, speed in the production process		
Gain time in the process	Advantages of processes	
Better synchrony between production and inventory and production management.		
Greater programming autonomy for the sector itself.		
Better organization and control		
Elimination of inefficiencies.		
Ease of daily production control		
Better control and agility.		
Early production to lack.		
Information security.		
Production of what is really needed.		
Accurate information of when and how much you need.		
Avoid materials without turning the stock.		
Decreased unnecessary movement.		

Source: Prepared by the authors, with information extracted from the interviews (2020).

Table 3: Difficulties in implementing the Kanban system.

Open Coding	Axial Coding	Selective Coding
Employees believe it works.		
Greater control of information is required.		

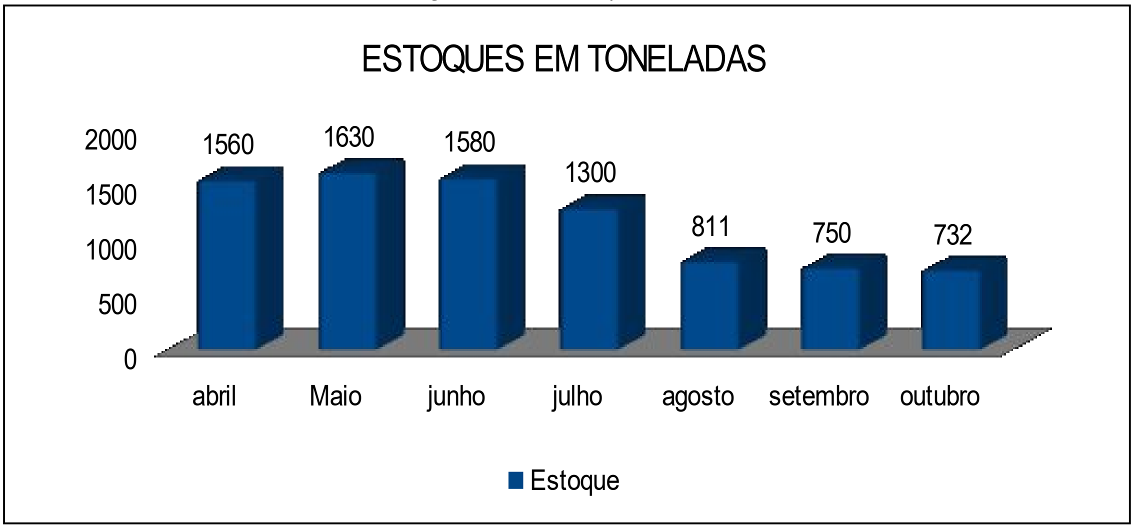
Increase user accountability.	Difficulties for people.	Difficulties in implementing the Kanban system.
Employee resistance.		
Adaptation of people to the new system.		
Need for employee training.		
Implementation cost (Low).	Structural difficulty.	
Purchase of devices for stacking the coils.		
Reorganization of current stocks.		
Need for continuous improvement.		

Source: Prepared by the authors, with information extracted from the interviews (2020).

It should be noted that infirst month of implementation of changes that occurred in July 2016, in which this study was separated into two periods: traditional system (before the change) and Kanban system (after the change), with the average of each of these periods being analyzed: April , the traditional system in May and June and the Kanban system in August, September and October, enabling comparison in this sense. It should be noted that the month of July, which was the transition period from one system to another, was not counted.

From the point of view of numbers, Figure 3 showed a decline in relation to inventories from the moment the company began to implement the Kanban system, in which undefined materials were removed or that did not meet the desired quality level, reducing the stock level.

Figure 3 - Inventory level in tons

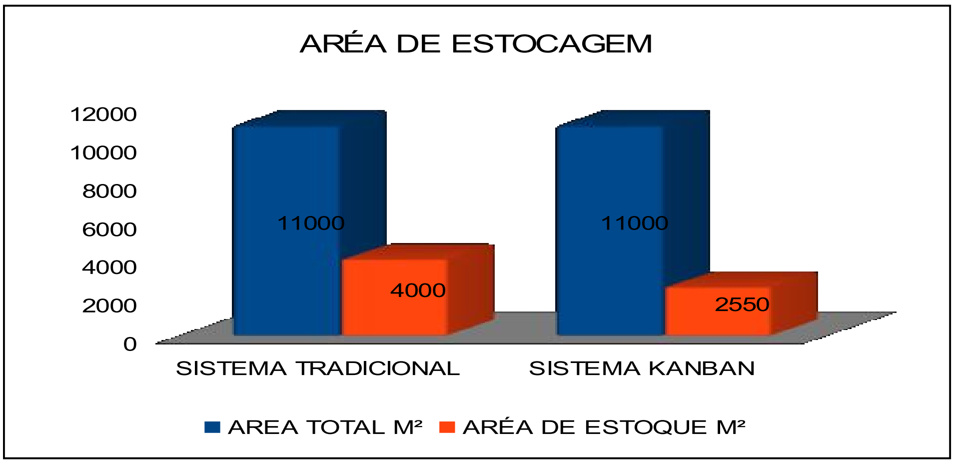


Source: Prepared by the authors, with information from reports of the studied company (2020).

It is worth commenting that the decrease in the stock level after the implementation of the Kanban system is evident, in which the stock of 1,560 tons of aluminum changed to 732 tons of aluminum, without compromising order fulfillment or lack of aluminum.

In addition to this, through the development of devices for stacking coils, they were stacked on two levels, thus optimizing the stock area used as shown in Figure 4.

Figure 4 - Comparison between stock area occupied by the two systems.

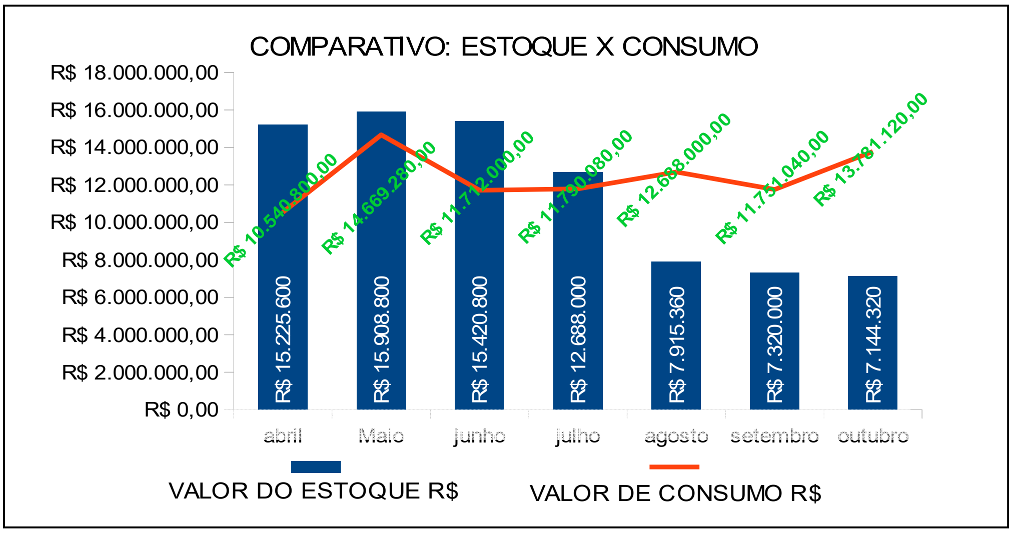


Source: Prepared by the authors, with information from the company studied (2020).

In this sense, there is a decrease in the area used for stock, in the traditional system that used 4,000 m² prior to the change and the reduction with the Kanban system, which uses 2,550 m² after the change, a 36% reduction in the area required for storage.

Another relevant aspect refers to the reduction of inventories in which we can compare the level of fixed assets, as we can see in Figure 5.

Figure 5: Comparison between stock value and monthly consumption value



Source: Prepared by the authors, with information from reports of the studied company (2020).

In this aspect, it can be seen that the values fixed with raw material in relation to monthly consumption, had a significant decrease in the average consumption of the evaluated period of R $ 12,307,360.00 and in relation to the average stock of the same period R $ 15,518,400.00, with a stock of 1.26 months being maintained. After implementation, the average consumption of the second period evaluated was R $ 12,740,053.33 and with respect to the average stock of the same period of R $ 7,459,893.33, being a 17-day stock, a reduction of 52 % of inventories, which means greater liquidity and more resources available, for other investments.

Another aspect highlighted by the interviewees refers to obtaining an advantage with the implementation of this system, with greater control over inventories, better production planning, reduction of inventory levels, gains in physical space, more reliability, organization, agility and providing more financial resources for the company's cash. This system is meeting the need, as it facilitates greater production control, with accurate information, organization and control efficiently. As highlighted by Interviewee A:

> [...] Reduction of inventory levels, more reliable and organized stocks, gaining in agility.

Interviewee B also points out:

> [...] Many advantages were obtained such as: A noticeable reduction in inventories, causing gains in speed, physical space and the cashier thanks you.

In this horizon, theThe managers comment on the company's interest in expanding this system to the other inventory areas, as it allows the synchronization of production in a safe and reliable way, with flexible scheduling and facilitates a lot in the daily control of production. Presenting the results immediately, visible and measurable, as perceived by Interviewee B:

> [...] the results are immediate, visible, measurable and the team's commitment is greater, with greater safety and reliability.

6 CONCLUSION

This study was outlined through the predefined general objective, which benefits a company in the metallurgical sector can obtain due to the Kanban system, identifying opportunities and gains with the implementation of the proposed system.

It was observed that inventory management plays an essential role for the company's performance, this is evident in the development of activities carried out in this sector, which bring significant results.

By implementing the proposed system, the sector reduced inventories and was able to count on a stock more proportional to its needs, where it made available a significant amount of financial resources immobilized with inventories for other investments, increased reliability with more accurate information, through computerized management , precise sizing of productive capacity and the elimination of unreliable products, also decreased the storage space with more organized stocks that facilitate movements, thus gaining agility and greater efficiency, being in line with the trends found in the literature of the premises Just In Time, which aims to improve productivity globally with a disciplined approach, aiming at eliminating waste, minimizing the use of human resources,facilities, equipment and materials (SLACK; CHAMBERS; JOHNSTON, 2002).

It should be noted that, as this is a case study, the work is of a qualitative nature, its results do not allow generalizations to other contexts. As a suggestion for future studies, we propose a more in-depth analysis of new changes in the processes of that company, with the expansion of the Kanban system.

Finishing this analysis, it can be concluded that the study has reached its practical and theoretical objective, in which it demonstrated the benefits that the Kanban system can generate in a large company. Realizing that it is not necessary a large volume of investments to achieve satisfactory results, improving reliability, organization of stocks, agility, freeing up physical space and financial resources. It is emphasized that this process must have continuous and systematic monitoring by managers, in the constant search for improvement.

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