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Standardization of methods, steps and inputs in the production chain during the textile dyeing process

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ABSTRACT
The textile market in Brazil is quite significant in terms of global production, ranking fifth among the world's largest producers of textile manufactures, according to the Brazilian Textile Industry Association (ABIT, 2018).

Keywords: Standardization, Production chain, Textile dyeing.

INTRODUCTION

The representativeness of the textile market in Brazil is quite significant in terms of world production, occupying the fifth position among the largest producers of textile manufactures in the world, according to the Brazilian Textile Industry Association (ABIT, 2018).

Although competitive, the sector has been finding it difficult to maintain its position in the market, due to the slowdown in the world economy. According to the Trade Balance, the sector's balance went from negative US$4.1 billion in 2016 to negative US$3.2 billion in 2017. Investments in the sector increased from R$1,671 million in 2016 to R$1,900 million in 2017, and the textile chain's revenue increased from US$39.3 billion in 2016 to US$45 billion in 2017, according to information from ABIT (2018).

Faced with this scenario, companies in the sector are increasingly investing in methods and tools that aim to reduce losses and improve product quality. The standardization of methods and raw materials is one of the means found to achieve these desired results.

According to Moura (1999), when standardization is applied, it is said that the organization presents a competitive advantage through the implementation of the culture of "doing it right the first time". As a result, it can be said that standardizing means ensuring that activities are carried out in the best possible way, thus ensuring the reproducibility and quality of products. However, continuous improvement must be constantly sought, so that there is operational improvement in the activities, processes, methods and equipment of the sector.

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OBJECTIVE

This work had as its object of study a medium-sized company, in the textile industry, and the general purpose was to relate the standardization of processes with the gains related to quality and waste reduction, applied to the organization.

METHODOLOGY

The work that will be presented below refers to a case study of a medium-sized textile company, located in the Brazilian Midwest, whose main characteristics are the production and processing of articles for decoration and upholstery. A case study, according to the words of Yin (2015), is understood as an investigation of data and facts, where it is based on experience, where its focus is directly related to the situations and results obtained within the work environment.

For a better explanation of the methods applied, it is necessary to make some observations about the flows and stages employed by production in the mentioned company, as well as the description of the methods and operation of the equipment.

The presentation of the work will be executed in the format presented as shown in figure 01, according to the proposed theme.

Figure 01 – Presentation Steps

Source: The Author (2018)

DEVELOPMENT

According to the proposal of this article, this literature review will address concepts, definitions of process standardization, brainstorming and quality tools, important components of this work.

CONCEPTS AND APPLICATIONS

Quality and productivity are key factors for competitiveness within the productive sectors of any organization. The quality having its changes over time, this being the key factor of success for businesses. Since competitiveness increases more and more, the quality offered in the services and products of customers has become a matter of utmost importance within companies, according to the words of Lobo (2003, pp. 1-3).

As a support to obtain and be able to deliver this quality to the customer, companies have what are called quality tools, which are nothing more than techniques used to measure, define, analyze and propose solutions to problems to act within the work processes, allowing greater control of processes and products or more improvements with decision-making. according to Total Quality (2018).

According to Lima and Carvalho (2011, p. 2), the standardization of processes seeks to reduce the variability of work processes without prejudice to the flexibility that should exist. Thus, products must meet consumer expectations at the lowest possible cost. Standardization structures are essential for a company to remain competitive in the market, as it affects production costs, delivery times, and customer satisfaction. Standardization is one of the main mechanisms to ensure a good perception of customers in relation to the products offered. The reduction of variation in the processes and procedures adopted in the company can only be promoted with the establishment of work routines.

There are many methodologies that, when worked on by the organization in a constant and disciplined way, help in both the personal and professional growth of companies. Each method can help with a given problem by bringing solutions and employee involvement, such as Brainstorming, which according to Meanings (2018), means brainstorm or brainstorm. It refers to a group dynamic, worked together with those involved in the sector or the situation that occurred, used to solve specific problems, develop new ideas or projects, gather information and stimulate the creative thinking of each one.

Ferro (2010) points out that, along with standardization, there are multi-qualification practices, with which people constantly learn various activities and functions that stimulate permanent learning and allow greater flexibility in the face of labor instabilities. It is not possible to improve processes without establishing standardized work.

As stated by Bastos et al. (2003, p. 3), the variations of the process are actually a sum of variations in the causes that constitute it, that is, the less the causes vary, the better or the lower the variations in the results. In this context, the role of standardization is vital, because the better the standards, elaborated and executed, the better the process will be. It is verified that the variation of a process strongly depends on the degree of standardization of this process. Standardization makes it possible to regulate the influential cause, or rather, to change its degree of influence on the final result, since standardization presupposes the establishment of the standard (goal and method) and its practical mastery. However, each and every process has variation. Measuring it and reducing it economically is a function of control. Thus, it is desired to control the quality of the process making it more competitive, it must be standardized, measured periodically, scientifically analyzed and standardized.

Ferro (2013) also points out that there are many ways to implement standardization. The big difference is standardizing with the involvement of the people responsible for the work, who are equally responsible for its improvement. Unlike previous efforts to define responsible teams to standardize the

work of others, they invariably malfunctioned. Equally, these ideas have been criticised for a long time. Contrary to what many believe, standardized work stimulates creativity – unlike "work without standardization" which, yes, tends to suppress creative processes by making everyday life always difficult.

Perin (2005, p.16) describes that through the standardized process it can achieve high levels of quality and high levels of productivity, as the result is the achievement of reproduction of a "best practice" for the activity. Thus, quality problems can be easily detected and appropriate actions can be proposed. With standardization, it becomes easier to verify the causes of certain waste, also attacking some problems in the pace of production. The efforts dedicated by some companies to increase productivity often do not value the issue of standardization as a primary process to identify problems and direct resources.

It is necessary to create practices and methods that give people the condition for them to always reflect on what they are doing. In this way, we will have everyone in the organization doing and thinking at the same time. It is an organization that truly learns and becomes very competitive, corroborating the words of Ferro (2016).

According to the considerations of Lima and Carvalho (2011, p. 7), when a company establishes the established work routines, it starts to act more independently, without the need for rigidity in the hierarchical coordination of the institution, since the workers have their functions well determined and are able to respond and make decisions with more ease and initiative.

Thus, as Bastos et al. (2003, pp. 6-8) point out, it is concluded that if the company's standards are periodically reviewed, either due to the need to seek greater competitiveness or to correct an anomaly, value is added to the standard. Since adding value is the goal of process control, then standards must be improved periodically, either by scheduled reviews or by process changes, or else to eliminate bad anomalies. In all cases, improvement is being practiced.

Perin (2005, p.18) observes that, in a standardized process, work is always performed in the same way, causing waste to appear in the same way. This allows the use of the resources in the problem solving and not in their definitions and classifications. Standardization values performance on the shop floor. It assists the production and support areas and shows the real problems of a production process.

Standardization ensures that each operator in the production process knows what to do, how to do it, and when to do it, as stated by Chaves (2007, p. 6).

Spohr et al. (2013, p.2) emphasize that the control of a process consists of evaluating its actual performance, comparing it with the goals established by the company and taking measures to correct the differences found. The result becomes the means to be used by the operational forces to meet the quality goals of the product and the process itself.

Thus, it can be affirmed that, through standardization, it is possible to better understand the processes, and the applicability of the methods constitutes the means to achieve the established goals. The

methods applied to achieve standardization are applied through quality tools, and their use allows, first, to know the processes, evaluate the points to be worked on, make the necessary corrections in the process, evaluating their effectiveness.

Thus, without the use of quality tools, it is difficult to apply process standardization, because, according to Pasquini and Ribeiro (2010, p. 12), the basis of the quality system is the knowledge of each process. It is necessary the appropriate use of the tools and a careful analysis to diagnose the causes that influence the methods. The tools deliberate the mistakes and successes, what needs to be repaired or not. The appropriate tools contain a set of performance indicators and allow the measurement of the behavior of all processes through their use. Quality tools are useful for managing a business and are simple to use, but one should not be fooled by this simplicity.

Also according to the authors cited above, quality tools are useful and simple for a company to manage. Consequently, the company must realize that such simplicity implies gains, since its use reduces the number of failures, reprocesses and production custos.de. The tools facilitate the proactivity of employees and the better operationalization of the process, an instrument for decision-making. In addition, it allows anticipating possible failures, in order to improve the planning of the execution of each service, allowing preventive and corrective actions in the processes, reducing their variability. In this sense, the use of quality tools has been of great use in the implementation of practices and techniques that ensure the standardization of the methods and products used in textile dyeing.

Analyzing this statement, it is understood that, although simple, the quality tools used must have, in addition to the feasibility analysis of their application, the correct establishment and use so that there is the best possible use of the results.

CONSIDERATIONS FOR TEXTILE PRODUCTS

Textile products, when they are produced, have slightly rustic aspects such as stains, roughness, oils, greases, or do not have the color characteristics requested by the customer.

To meet these requirements, it is necessary, therefore, processes that aim to give them characteristics for better use, such as softness, silky touch, removal of stains and coloring. This is the function of textile processing, which has the purpose of giving the fabric the characteristics appropriate to the customers' request, thus adding value to the final finished article.

PRODUCTION FLOW

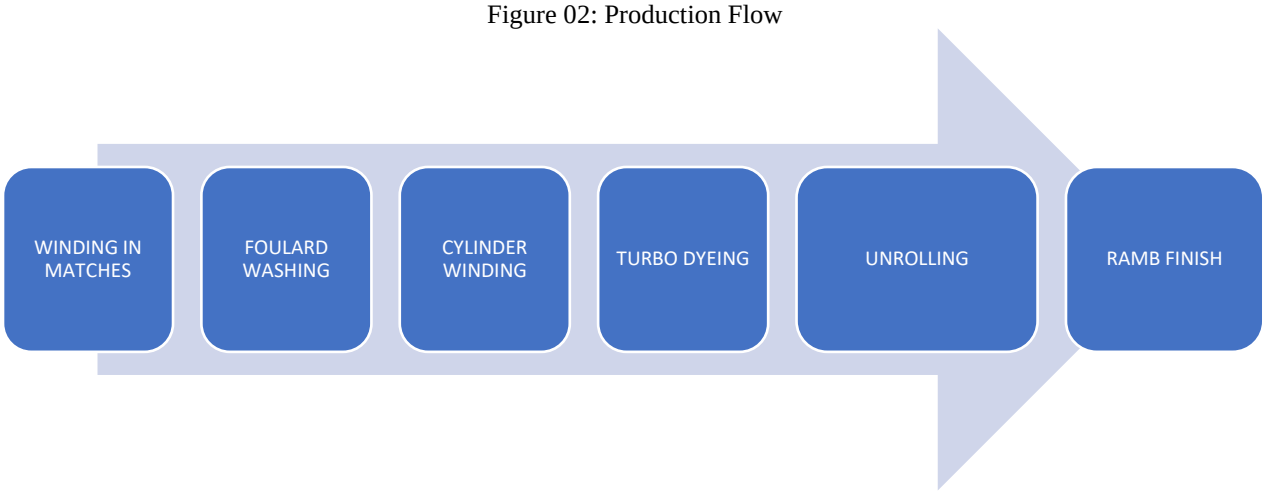
The production flow for each textile article is previously established by the development sector, through tests in the production sector. In this way, each fabric to be processed in dyeing already has

determined the treatment that will be applied so that the characteristics and quality desired by the customer are maintained.

When the fabric is approved, its flow follows the specifications established for each article, and can go through several phases, so that more elaborate characteristics are given to the fabric, or only through some phases, when it is desired to obtain a fabric with more rusticity.

Figure 02 exemplifies the production cycle of an article used by the company.

Figure 02: Production Flow



Source: The Author (2018)

EQUIPMENT AND PRODUCTION PROCESSES

In the Dyeing sector, some equipment with very specific functions for the processing of the fabric are used:

- Foulard: is the equipment used to wash fabrics to remove surface dirt, where the article goes through a bath (with or without chemicals and high temperature) and then squeezed, in a uniform way;
- Turbo: this is the company's main dyeing equipment, for the production of the vast majority of the fabrics processed in Dyeing, which is responsible for performing:
- Purging: processing to remove impurities, dirt, molds, greases and oils, with the use of chemicals, temperature and pressure;
- Bleaching: treatment that consists of bleaching the fabric, in a more accurate way, to obtain sharpness and uniformity, combined with the application of optical brighteners, to increase the degree of whiteness of the substrate;
- Dyeing: uses high temperature and pressure, in addition to the combination of dyes that require appropriate specifications and quantities, and auxiliary products, for better dispersion of dyes, better fixation and color fastness;

- Rama: through it, the following can be carried out:
- Dyeing: application of dye to the fabric through a bath and subsequent squeezing, with simultaneous drying;
- Drying: removal of moisture from previous processes;
- Thermofixation: procedure to provide dimensional stability to the tissue;
- Finishing: it is carried out for the application of chemical products with simultaneous drying or just to give the fabric a differentiated touch through the use of temperature;
- Tepa winding machine: this equipment is responsible for winding the fabrics in hollow cylinders, specific for dyeing in Turbos, with the use of flanges and steel plates to retain the roll in the cylinder and correct homogenization of the bath in the Turbo.

WORKING PARAMETERS

The equipment also works with some very specific patterns to give the proper results to the fabrics.

Dyeing Graphics for Turbos represent, in a visual way, all the phases necessary for the coloring of the fabric, inside the equipment (turbo). The filling, heating, washing, product application, cooling and emptying phases are included.

The colors, classified as light, medium and dark, are inked in different ways, where chemicals and dyes are added to the bath in a certain order and have a time of permanence determined, according to the graphs. The elevation time and the temperature and pressure levels are specific to the color classifications, and have a controlled scale.

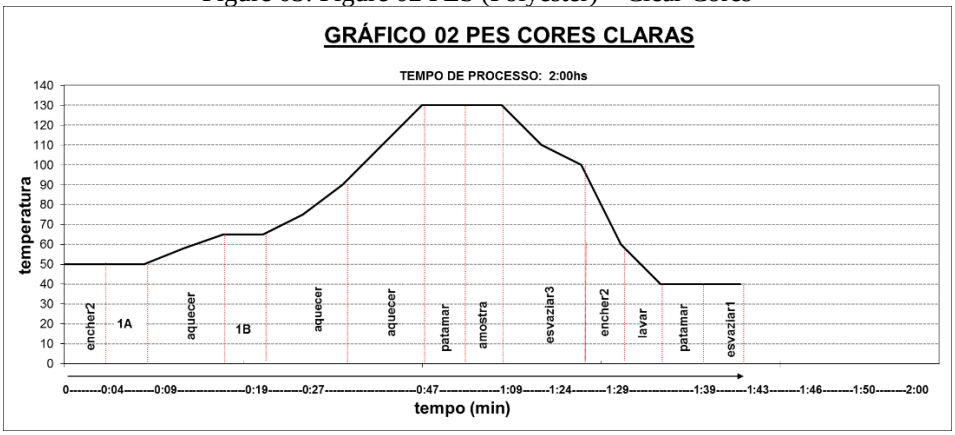
The organization has four turbos, and each turbo has the record of all the work charts, and according to the specification of the programming and the recipes contained in the system, the work program for the desired process is selected. Table 01 and Figure 03 represent a graphic model for light color dyeing, used in the process.

Table 01: Dyeing Steps Graphic 02 PES (Polyester) – Light Colors

GRÁFICO 02 PES CORES CLARAS			
PASSO	**DESCRIÇÃO**		**BOMBA:**
1	INÍCIO DO PROGRAMA		
2	ENCHER NÍVEL 2		50%
3	CHAMADA AUXILIARES	PREP. TANQUE 2-30-2-0	50%
4	INJEÇÃO	0-0.0-1-1	75%
5	AQUECER ATÉ 65°C GRAD. 0min.		90% PRESS
6	CHAMADA CORANTE	PREP. TANQUE 2-30-2-0	75%
7	DOSAGEM 5 min	0-0.0-1-5	75%
8	AQUECER ATÉ 90°C 1,2°C/min. 0min		90% PRESS
9	AQUECER ATÉ 130°C 1,8°C/min. 15min		90% PRESS
10	AMOSTRA		90% PRESS
11	ESVAZIAR 3	0-3-2	
12	ENCHER NÍVEL 2		50%
13	LAVAR TEMPO 3 min.		90%
14	PATAMAR 3 min		90% PRESS
15	ESVAZIAR 1	0-1-2.0	
16	FIM DO PROGRAMA	**TEMPO DE PROCESSO = 02:00hs**	

Source: Data taken from production provided by the Organization (2018)

Figure 03: Figure 02 PES (Polyester) – Clear Cores



Source: Data taken from production provided by the Organization (2018)

Branching Speed and Temperature is explained as follows: As each fabric has its own peculiarities and characteristics to be acquired during the branching process, each process of branching has an adequate parameter for each article worked, that is, depending on the initial characteristic of the article and what is desired from it when finished, it is necessary to control the variations of process speeds and temperatures to reach the goal stipulated during the planning phases.

Roll Tension and Plate Dimension in the Tepa Winder is understood according to the grammage of each article, the maximum weight and yardage allowed during the process are established. The degree of impregnation of the bath happens more easily for articles with lower weights, as they are thinner. For this reason, the plates need to be differentiated for each fabric. Tension is applied to the winding so that the fabric does not unravel during the process inside the machine.

Products used in the process have some ramifications. For the dyeing techniques employed, there are some types of products that are very characteristic of the processes, and they are divided into two groups:

- Dyes: These are products that give color to textile items. They have different classes, different forms of dissolution, different chemical characteristics and dyeing behavior. For the development of specific colors, laboratory tests are carried out, whose combination of dyes provides the desired color.
- Auxiliaries: These are products that have several faculties, from preparing the fabric for dyeing, equalizing and assembling the dye, assisting in reproducibility, offering better color fixation in the fabric, preventing the development of fungi, bacteria, among other functions of extreme importance in the process. They are acids, alkalis, salts, oxidants, reducers, detergents, fixatives, pH regulators, anti-frayers, stabilizers and dispersants, which when correctly used, provide the articles with the qualities desired by customers.

RECIPES FOR DYEING

Each roll of fabric to be processed has an identification that displays all its characteristics, such as identification number, article, color to be dyed, size, weight, among other information of extreme importance to the process. Based on these characteristics, the recipes for the articles are issued, considering the bath ratio in the machine, the chemicals used and their appropriate quantities, according to the weight and size, the sequence in which each product is added to the process and in which equipment it will be made available. In this way, all products are weighed by recipe and made available in the equipment in which they will be used.

APPLIED TOOLS

The techniques used for the standardization of methods and products and the reduction of waste were diverse, considering the various tools available, such as Flowcharts, Ishikawa Diagrams, 5W2H, PDCA and especially Brainstormings, for better analysis of causes. It is important to highlight the adoption of the Lean philosophy by the company, which provided a considerable advance in the results obtained.

PARAMETERS

In the work developed for the dyeing, purging and equalizing charts, the combination of the various existing equivalent graphics was carried out, their most appropriate application according to the task, the color and the article produced. After associating the similar graphs, they were replicated for all

the equipment that uses them, their registration in the system's recipes, as well as the removal of similar graphs, avoiding inaccuracies and possible mistakes.

The speed and temperature parameters of the Rama were all reviewed, through tests elaborated in production, for each article, specifically.

The tension of the rolls and dimensions of the plates were standardized through the application of tests, using all the dimensions of plates available for the various articles. The best results obtained were replicated, evaluated again, and the final result established as a standard.

DYEING RECIPES

The development of colors through the most assertive combination of dyes and auxiliaries was carried out in order to select the best products and relate them to the methods used in their practical application.

As mentioned earlier, the issued prescriptions had all the products weighed and made available on the equipment to be used. However, this generated an excess of containers, often unidentified, and a certain disorder due to the number of buckets in the equipment, which often did not have any identification, generating possible mistakes in use. In order to improve the process of issuing and weighing products, the recipe was divided into phases, according to the dyeing charts, and the identification of each bottle was mandatory. In this way, the amount of products to be weighed and disposed of in production has decreased considerably, as well as possible dosing errors.

CHEMICALS (DYES AND AUXILIARIES)

When a product is totally similar to another, the latter is considered as a countertype. The use of countertypes is very common in production, because it makes the costs of the process viable, and because it allows a greater variety of combinations for color development.

The use of specific dyes, without the combination of countertypes, was the alternative used by the company for better color reproducibility, ensuring better quality in the final product.

The action corresponding to the use of specific dyes was to select, among the various suppliers of several different brands, the one that best adapted to the determinations of quality and cost-benefit, with the guarantee of reproducibility of the colors.

The analysis laboratory was equipped with automatic pipettes, in order to obtain more accurate measurement results, reducing unsafe conditions for the employee and reducing the waste of inputs. As a result, pipetting time was decreased by 51.93%, so analytical processes became more reliable and less susceptible to errors.

PRESENTATION AND DISCUSSION OF RESULTS

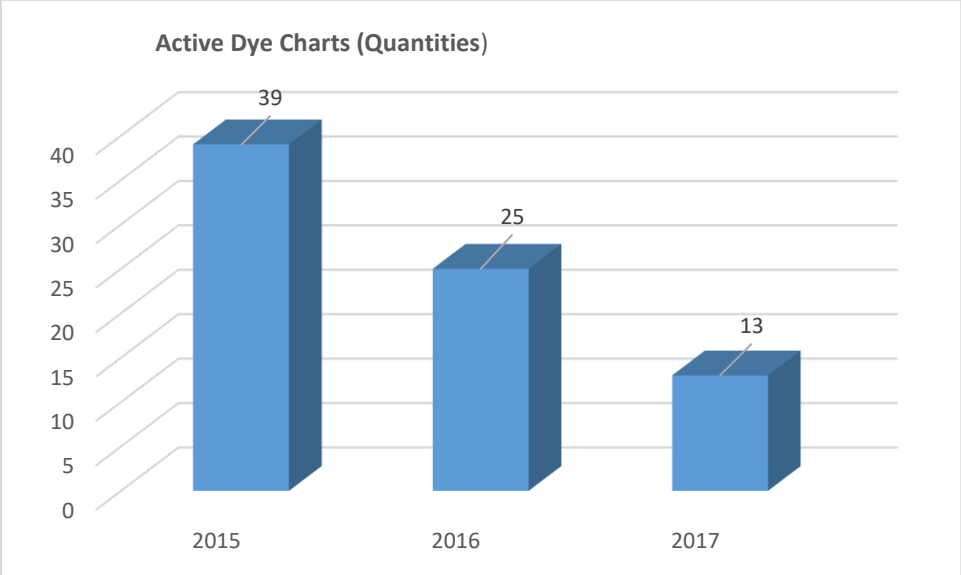
As described by Curi Filho (1999, p. 62), there are several benefits that standardization can offer, among which the following can be mentioned:

- Qualitative benefits related to the proper use of equipment, raw materials and labour; assists in the training and improvement of the technical level of the workforce; it also records the knowledge acquired by employees;
- In the operationalization of processes, standardization ensures the control of products and processes, as well as the safety of personnel and equipment. It contributes significantly to the rationalization of processes, being a very broad source of continuous improvements;
- Quantitative benefits provide reduced consumption and waste of materials. It also promotes the standardization of components and equipment; Reduction of product variety, increased productivity and improved quality of products and services.
- In fact, the description highlighted is equivalent to the observations made concerning the benefits achieved by the organization. The application of the standardization methodology in the company consisted of an activity implemented in phases, where each stage constitutes a sum of efforts between employees and coordination, to obtain better results, both for the institution, in the form of waste reduction, and for the workers themselves, with improvements applied to the workstations.

PARAMETERS

Regarding the Dyeing Charts, the result of the study and selection of the most comprehensive charts in relation to the manufactured articles was a decrease of 66.66% in the number of work charts, also reducing the margin of error through the presentation of the chart to be used in the recipes. Figure 04 shows the gradual decrease in the number of active charts.

Figure 04 – Active Charts



Source: The Author - Based on data provided by the Organization (2018)

About Branch Speed and Temperature, according to the survey, study and application of the best working speeds for the branch, the following results were obtained:

- Increase in the speed of thermosetting of article 4500 (Suede) in Rama, increasing productivity by 30%, without loss of fabric quality, thus increasing the availability time of the machine and reducing the use of resources (gas);
- Reduction of the cost of the finishing process in the branch for article 1778 (satin) by 15%, through the removal of the finishing product from the recipe, followed by the finishing in water, without changing the quality of the fabric.

Regarding chemical products, there was a reduction in the waste of chemical products by 10%, through the adaptation of the packaging of the inputs, facilitating the handling and improving the ergonomics of the employees and reducing the pipetting time of dyes and auxiliaries in the development of samples for the Dyeing Plant by 40%, reducing unsafe conditions and the delivery time of the recipes.

OTHER COMMENTS

Regarding the structuring of the PCP, it was observed that another factor of great importance was the lack of structuring in the planning department (PCP). Most of the production needs were carried out based on customer orders, after being agreed by the Salesperson. The replenishment of stocks was performed according to ABC curve analyses, but the system, with reference to the information notes, did not provide reliability in its results.

In this way, the productive sector worked in a scenario with many priorities pointed out and machines with limited availability to cover orders, without a sector responsible for analyzing the causes and pointing out improvements.

Through the structuring of the PCP sector, a database was created with all the information pertinent to production, with indexes, monitoring, indicators, daily schedules and notes, aiming to provide the productive sector with all the support so that production was based on concrete information, considering possible stockouts and working with sufficient stock margin to serve customers immediately.

The study of capacities brought the following reflection: The dyeing production target did not consider whether the equipment (Ramas) or the next sector (Revision and Cutting) would absorb the production carried out, thus generating the accumulation of wet fabric (with potential risk of stains) and a high stock of Semi-Finished fabric. Production was pushed, and the constant declassification of fabrics caused an increase in the demand for top quality fabrics, which further contributed to production being pushed and not pulled as the Lean philosophy guides.

Another benefit acquired with the structuring of the PCP sector was that in this way all capacity surveys can be ascertained, with the establishment of studies related to the processes, chronoanalysis (a tool that aims to determine the ideal times needed for each stage of the process) for the equipment, production methods and setups. The result was a decrease in intermediate stocks and products in process, with a consequent decrease in declassification due to stains derived from the excessive time in which the product remained wet.

There was also the creation and monitoring of indicators. With the implementation of Lean tools, studies were carried out to create and monitor indicators in the productive sector, which led to a better conception of the results and a better visualization of the productive scenario within the sector.

The following relevant indicators for the sector were then calculated and created:

- Accuracy of Chemical Stock;
- Dates;
- Reprocessing;
- 5S;
- Productivity Gain;
- Adherence to the Production Plan.

The improvement of the notes happened by the simple filling of data in the production sheets was related to the observations about the machines and possible stoppages, and the data entered in a logbook

made it easier to understand for everyone in the sector. Thus, a database was created with all the notes related to the operation of the equipment and any stoppages.

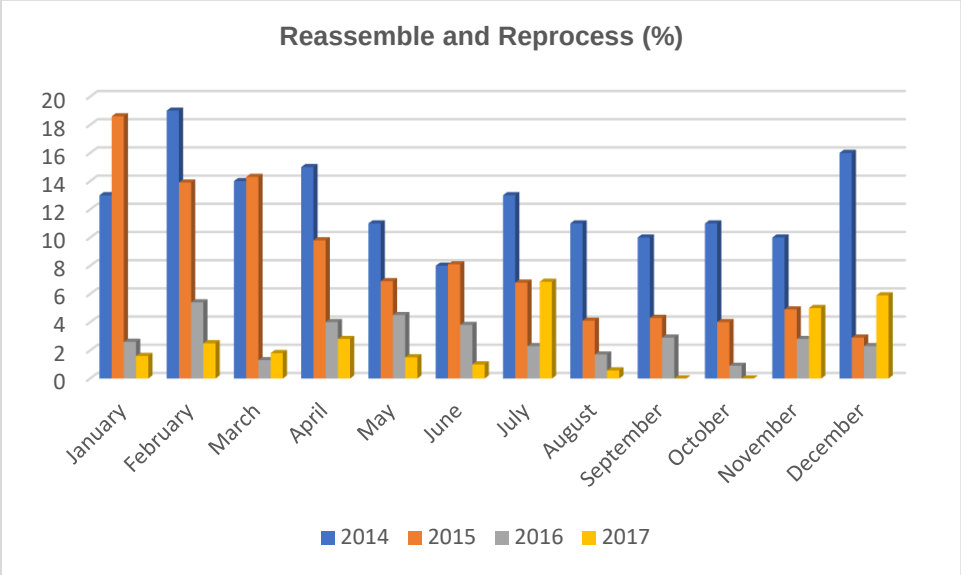
We also have:

- Structuring of the Preventive Maintenance Calendar: The shutdowns for preventive maintenance now have an annual calendar, and the schedules are structured together with the PCP and the productive sector, so that the shutdowns cause the least possible impact on the sectors involved, and the schedules are carried out considering the scheduled shutdowns;
- Use of Kanban to reduce waste with movements: The rolls are packed in their own structure, individually marked with numbers, and their movement is carried out independently, without the need to circulate several rolls to remove one. Location is also facilitated by the use of a table with numbered plates, containing on each plate, the number of the roll location shelf. The documents generated for the production of the roll (Processing Order) are packed in the plates and according to the schedules, they are removed, together with the respective roll, and are sent to production;
- Reproduction and Reprocess Indexes: Restages and reprocesses are synonymous with rework, arising from defects presented in the fabrics. What differentiates them is only the phase in which they are classified. In the case of remontas, the verification of defects in the fabric still takes place in the productive sector. The reprocess, in turn, has the failures observed after the release of the tissue to the Revision and Cutting sector. In both cases, due to the type of defect found, the treatment is analyzed for the best use of techniques, for the most appropriate adjustment of the tissue to the needs.

The rebuilds and reprocessing indices are the most representative in terms of quality. As the purpose of the Dyeing sector is to produce articles with quality and low cost, the numbers presented really show that the actions applied, both in terms related to Lean Manufacturing management, as well as techniques alluding to the participation of employees in discussions (brainstorming), were really effective and the results can be even better, if the actions continue to be applied.

Figure 05 shows the re-reprocessing and reprocessing indices obtained over the period from 2014 to 2017.

Figure 05 – Indexes of Remounts and Reprocesses



Source: The Author - Based on data provided by the Organization (2018)

The rework generated by the reassemblies and reprocesses directly implies the costs of the sector, as it uses labor, inputs, availability of machines and other elements related to the process, so that the declassified articles can be treated, in order to receive the necessary classification for revision and cutting.

The drop in rework rates is the result of the application of quality tools in the sector. In addition to the performance achieved, observed in numbers, there are the gains represented by the more active participation of employees, which demonstrates greater involvement of everyone in the process.

FINAL THOUGHTS

Based on the results obtained through the standardization process applied to the company's productive areas, it is concluded that the methods used here are really substantial in increasing productivity and improving the performance of activities in the sector.

In the case of quality tools used, it is necessary to emphasize that their diffusion in the manufacturing environment has resulted in the promotion of continuous improvement, where their use is so implicitly linked to processes that it has become an ever-present element in the corporate culture.

Although the balance of the application of standardization processes in the company under study has been positive, with gains related to the reduction of waste, increased productivity, improvement of processes and systematization of procedures, there are still some issues pertinent to the application of these methods that can generate even more gains.

Considering that the application of the methods has been carried out in a segmented manner, and the considered time of application in the general scope is considered relatively short, the use of the targeted procedures must be continued in order to achieve even more satisfactory results.

Finally, it is understood that the stability now achieved in the processes provides reliability to all those involved in their consolidation, which goes beyond the understanding of financial gains. The visualization of the entire set operating according to the proposal of establishing standards demonstrates that the good practices evidenced here are really decisive for obtaining good results.

REFERENCES

ABIT (Associação Brasileira da Indústria Têxtil). (n.d.). Retrieved on 05/05/18 from http://www.abit.org.br/cont/perfil-do-setor

Bastos, R. M., & Turrioni, J. B. (2003). A implementação da padronização participativa sob a ótica do TQC – Estudo de caso na CSN (Companhia Siderúrgica Nacional) (pp.6-8).

Chaves, J. G. B. (2007). Aplicação da padronização do método de trabalho segundo uma metodologia baseada na produção enxuta: um estudo de caso (p 06). Departamento de Engenharia de Produção, Universidade Federal de São Carlos, São Carlos/SP.

Curi, D. F. (1999). Um agente de entrelaçamento. Revista Controle da Qualidade, 62.

DalForno, A. J., Forcellini, F. A., Pereira, F. A., Kipper, L. M., & Loos, M. J. (2015). A padronização do processo como primeiro passo para a implementação do desenvolvimento lean de produtos-Evidências da indústria Têxtil (p. 02). Tecno-Lógica.

DeFalani, S. Y. A., et al. (2014). Mapeamento do fluxo de valor para melhoria de processo de uma indústria têxtil (p. 09). Espacios.

Dennis, P. (2008). Produção Lean Simplificada. Porto Alegre: Bookman.

Ferro, J. R. (2016). A mágica do trabalho padronizado. Lean Institute Brasil. Retrieved on 02/05/2018 from https://www.lean.org.br/colunas/160/a-magica-do-trabalho-padronizado.aspx

Ferro, J. R. (2006a). Como ficam as carreiras na empresa. Lean Institute Brasil. Recuperado em 14/05/18 de https://www.lean.org.br/colunas/375/como-ficam-as-carreiras-na-empresa-lean.aspx

Ferro, J. R. (2006b). Efetiva solução de problemas: o que está faltando? Lean Institute Brasil. Retrieved on 28/03/2017 from http://www.lean.org.br/leanmail/35/efetiva-solucao-de-problemas--o-queesta-faltando.aspx

Ferro, J. R. (2016c). Por que é importante colocar toda a empresa para pensar. Lean Institute Brasil. Retrieved on 03/05/2018 from https://www.lean.org.br/colunas/473/por-que-e-importante-colocar-toda-a-empresa-para-pensar.aspx

Filgueiras, K. C. T. (2015). Aplicação do MASP e ferramentas da qualidade para redução de refugos e retrabalhos no processo de tintura de fios: estudo de caso na indústria têxtil.

Lima, B. T. P., & Carvalho, L. C. J. (2012). A importância da padronização de processos e gerenciamento no setor de fast-food em Florianópolis (pp. 2-7).

Lima, L. C. (2016). Aplicação de ferramentas de qualidade para solução de problemas no processo produtivo com ênfase nos princípios da produção enxuta.

Lobo, A. C. O. (2003). Qualidade e produtividade (pp 1-3).

Maizuck, J., & Andrade, P. P. (2013). Aplicação de Ferramentas de melhoria de Qualidade e produtividade nos processos produtivos: um estudo de caso. Qualitas Revista Eletrônica. Retrieved on 25/04/2018 from http://revista.uepb.edu.br/index.php/qualitas/article/view/1599

Moura, J. A. M. (1999). Os frutos da qualidade: a experiência da Xérox do Brasil (3ª edição revisada e ampliada). São Paulo: Makron Books.

Pasquini, N. C., & Ribeiro, A. M. R. (2010). Avaliação do uso de ferramentas da qualidade em empresas do setor têxtil instalada da região do pólo têxtil. IESA – Instituto de Ensino Superior de Americana (p. 12).

Perin, P. C. (2005). Metodologia de padronização de uma célula de fabricação e de montagem, integrando ferramentas de produção enxuta (p. 16). Escola de Engenharia de São Carlos, Universidade de São Paulo, São Carlos.

Qualidade Total. (n.d.). Retrieved on 04/05/2018 from http://www.apostilasdaqualidade.com.br/o-que-sao-as-ferramentas-da-qualidade/

Rodrigues, J. F. A. (2016). Impacto do setup na produtividade operacional: um estudo de caso em uma indústria do segmento têxtil no município de Cruz das Almas-Ba.

Significados. (n.d.). Retrieved on 04/05/18 from https://www.significados.com.br/brainstorming/

Spohr, J., Jeferson R. A., & Régio M. T. G. (2013). Análise de processos Industriais em uma empresa prestadora de serviços do setor têxtil (p. 02). Revista de Ciências Empresariais da UNIPAR.

Teixeira, P. C. (2014). Padronização e melhoria de processos produtivos em empresas de panificação: estudo de múltiplos casos (p. 2). Production.

Yin, R. K. (2015). Estudo de Caso-: Planejamento e Métodos. Bookman editora.