



**THE IMPLEMENTATION AND USE OF THE "5 S" AND KAIZEN PROGRAM FOR THE MANAGEMENT OF SEWING OFFICES OF A MIDDLE FAMILY COMPANY**

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**ABSTRACT**

A century that defined the price of its product was the company. Today, in the 21st century, who defines the price is the market. That is why one of the managers' roles today is to look after maintenance and seek continuous improvements in order to reduce costs so that profits are maintained or raised. This article deals precisely with this, through the statistics applied to performance and quality indicators. Before starting the kaizen process, this article discusses the implementation of 5S in the target company of the case study in order to organize and standardize the processes. After 5S, the kaizen was implanted and data were collected that were treated statistically.



It was concluded that the system was confirmed by the statistical results after the treatment and analysis of the data, and that the main purpose of these two tools, 5S and Kaizen, is to improve competitiveness and why not say, Have more assurance of the company's sustainability.

**Keywords:** Kaizen; 5S; Statistic; Productivity; Quality

## 1. INTRODUCTION

Introducing quality programs has become the strategy of many companies in the search for a differential, that is, adding value in products through their quality in order to seek competitive advantage (COSTA; REIS; MIRANDA, 2005). The requirements of quality, delivery times, the needs of smaller lots, better prices, among others, are the need of companies in search of continuous improvement in function of the fashion trend, which promote substitutions for new articles and colors. (HAFFAR, 2002).

In this scenario of constant changes, high competitiveness and the need to serve the consumer properly, with products and services have been key factors for the insertion of programs known as 5S, which is the initial step for the implementation of quality programs and Kaizen to help companies become more efficient and productive. (GUPTA; JAIN, 2014; COSTA; REIS; MIRANDA, 2005).

Based on studies by Gupta and Jain (2014), it can be affirmed that the introduction of the "5 S" and Kaizen, bring great changes in the organizations, for example, increased efficiency, reduced waste, improved visibility of processes, increased employee safety and morale, and reduced delays, which is demonstrated in Haffar's (2002) survey, in response to two important questions, according to Table 1:

Table 1: How do you get product quality?

Items	% Response
Process Knowledge	70,4
Quality control	69,4
Quality of Raw Material	64,3
Comparison with Competition Products	49,0
Quality of Equipment	41,8

Source: Haffar (2002).

According to table 1, it is possible to state that having process knowledge is fundamental to the application of support tools ("5 S" and Kaizen, for example) to achieve a systematic improvement in the reduction of waste.

Tools should always be seen as a means to achieve goals or objectives. Means are tools that can be used to identify and improve quality, while the goal is where you want to go (end).

The importance of the study on the tool "5 S" and Kaizen in a confection is due to the sector's relevance in the Brazilian economy, which according to ABIT (2016) is the second largest employer in the manufacturing industry, with 33,000 formal companies across the country, and the fourth largest garment park in the world.

The "5 S" has the ability to modify individual and organizational habits, providing a pleasant environment through the creation and maintenance of good habits in organizational routines and improving the quality of organizational life of employees. (COUTINHO, AQUINO, 2015).

Kaizen is one of the most recognized techniques of continuous improvement, and its application in the industry aims to increase its productivity through a simplified system of incremental improvements and lead to the success and growth of the organization. (BHOI, DESAI, PATEL, 2014).

## **2. METHODOLOGY**

The objective of this work was to implement the "5 S" program in a medium-sized confectionery industry located in São Paulo in order to maintain the motivation, the involvement of all employees and the culture of standardization of the results achieved, which is the basis for continuous improvements (kaizen) in the management of external sewing workshops, which has a direct influence on the productivity of a garment company.

The analysis was based on the observation of the productive process in the company as a whole, and in the external sewing workshops. The nature of this research is applied, according to Silva and Menezes (2005). Its purpose is descriptive, according to the authors Martins, Mello and Turrioni (2014), because it aims to describe the behavior of the variables involved in the research. From the point of view of the technical procedures, the research is a case study according to

the authors Gil (2002) and Miguel (2007) this procedure clarifies the reason why a decision or a set of decisions were taken, as implanted and with what results have been achieved.

### **3. THEORETICAL REFERENCE**

#### **3.1. Program "5 S"**

Any program of quality and productivity improvement should begin with the change of habit of all employees regarding the organization, cleanliness, health and hygiene and order of the workplace (SILVA, 2003).

The "5 S" are seen as an important participatory program and drive for quality. The program provides the necessary knowledge to all participants for the proper performance and maintenance of their functions. In this way, because it is an integrated program, where its senses act interconnected, it provides surprising results in all aspects, both in the life of the employees and in the organizational environment, to lead the company with effective productivity gains (SANTOS et al 2006).

The name "5 S" comes from five Japanese words beginning with the letter "S" taking as an alternative in Portuguese the use of the term "sense", they are: Sense of Use or Discard; Sense of Storage; Cleaning Sense; Sense of Health or Hygiene; Sense of Self-Discipline. Oliveira et al (2015) explain each:

- Sense of Use (Seiri): consists in distinguishing necessary and unnecessary items based on the degree of necessity, which determines where the item should be stored or discarded;
- Storage Sense (Seiton): consists of defining the form of storage identification as well as the quantity and distance of the point of use. Factors like frequency of use, size, weight and cost of the item influence this definition;
- Cleaning Sense (Seiso) means much more than improving the visual appearance of an equipment or environment. It means preserving the functions of the equipment and eliminating risk of accident or loss of quality. Elimination of sources of contamination, the use of clear,

harmonious colors and the relay in cleaning tasks, contribute to the motivation and maintenance of this sense;

- Sense of Health and Hygiene (Seiketsu): means creating favorable conditions for physical and mental health, ensuring a non-aggressive environment, free of polluting agents, maintaining good sanitary conditions in common areas (bathrooms, kitchen, restaurant, etc.) for personal hygiene and to ensure that information and communications are clear, easy to read and understand;
- Sense of Self-Discipline (Shitsuke): this concept preaches education, obedience to working rules, especially with regard to organization and safety. It is a change of conduct that ensures the maintenance of the other senses, already implanted.

It should be noted that these senses move the organization from the current position to a desirable future position, adopting changes in behavior, and interpersonal relationships contributing to the development of the company (SANTOS et al., 2006).

### **3.2. Kaizen**

Kaizen is a combination of two Japanese words kai + Zen, meaning "Change for the Better," which has the sense of Continuous Improvement involving all employees (BHOI; DESAI; PATEL, 2014; IMAI, 1994).

Kaizen philosophy is based on the reduction of waste, and activities that do not add value, solving problems, learning with mistakes and correctness, teaching, knowing, sharing each knowledge, thus contributing not only to personal and individual growth, also professional and organizational, making continuous improvement (ALESSANDRA; MESQUITA, 2003; QUDDUS; AHSAN, 2014).

A better understanding of the concern for continuous improvement, which is the essence of Kaizen, can be obtained by understanding the PDCA Cycle (HORNBERG; WILL; GARGIONI, 2007). The PDCA cycle of Figure 1, acting in process control, is one of the most important concepts of the Kaizen, is a managerial method composed of four basic phases described by Aguiar (2002).

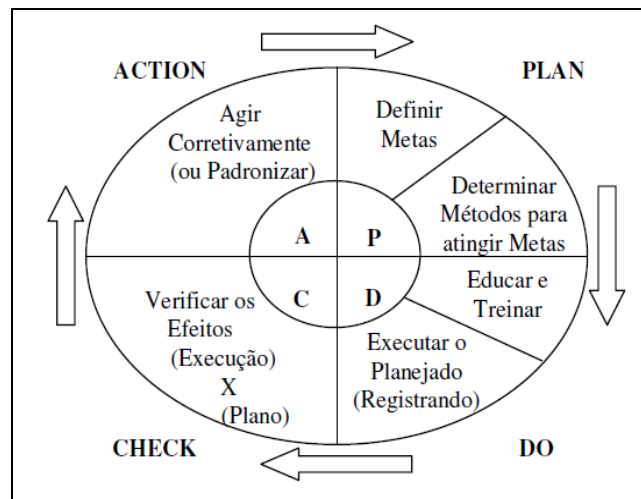


Figure 1: PDCA process management method.  
 Source: Aguiar (2002, p. 23).

Aguiar (2002) explains the 4 steps of PDCA:

- **Plan (Planning):** In the planning the goal of interest is defined and the means (action plans) necessary to reach the proposed goal are established;
- **Do (Execution):** For the execution of the action plans, people are trained in these plans. The plans are then implanted and data is collected that can provide information on achieving the goal;
- **Check:** With the use of the data collected in the Execution stage, an evaluation of the results in relation to the achievement of the goal is done;
- **Action:** A step where the user has detected deviations and will act to make definitive corrections, so that the problem will never happen again.

Kaizen also requires the standardization of improvement, consolidating the new level reached after the resolution of each problem. (IMAI, 1994). Only after the stabilization of the current process, through the maintenance cycle or SDCA cycle.

The "S" of "Standart" replaces the "P" of Planning because the goal, and the methods used to achieve them, is precisely the standard goal and operational procedures of the company (AGUIAR, 2002).

The application of the PDCA cycle is effective in managing a process, and it allows for two types of action: temporary and corrective. Temporary actions aim to correct problems immediately. Corrective actions are permanent because it consists of an investigation of the problem with the elimination of its causes, therefore it is the main tool for the process of continuous improvement in the process (SOKOVIC; PAVLETIC; PIPAN, 2010).

## **4. CASE STUDY**

### **4.1. Company Characteristics Analyzed**

The company studied at work is the parent company of a family company that produces and sells garments for large chain stores and magazines. The manufacturing unit where the study was developed is located in the city of São Paulo (SP). Its production processes consist of cutting the fabric, sewing parts, passing, and reviewing the parts that were developed exclusively for each order of delivery to the magazines.

The big challenge is to make the purchase of the fabric and supplies, cut and send for the making of the pieces in external and internal workshops, within the deadlines agreed with the magazines to avoid fines for not submitting the orders and the company be penalized with its exclusion within the framework of suppliers.

### **4.2. Identifying the Problem and its Actions**

The methods used for the data collection were: direct observation; participant observation; document analysis, and semi-structured interviews with the external workshops, where the problems that affect the company's production system were identified. A working group was convened at the company to apply Kaizen, using the PDCA, which resulted in an attached action plan, and the main causes were:

- Failure to read and interpret the product data sheet;
- Delay and accumulation in the delivery dates of the cuts sent to the external workshops;
- Failure to send the pilot part when the cut sent is divided with more than one external workshop depending on the time and production capacity of the workshop,



- Loss and lack of activities in external workshops;
- Lack of provisions in the cuts that are sent by the company to the external workshops;
- Delays in sending production samples from external workshops for quality control in the company and approval of production;
- Failure to systematically audit quality in the external workshop, and to receive the pieces made in the company;
- Failure of the rebate procedure of the parts that were rejected by the quality control in the company;
- Lack of information for the external workshops of reduction in the shipment of pieces due to the lack of requests of magazines and big stores;
- Lack of an early route of the company's drivers to deliver and remove the parts in the external workshops.

A quality committee was created to promote a change in company culture, and this group visited the factory where the following problems were identified and recorded with photos, which were directly affecting the production and delivery of orders:

- Difficulty in finding production orders, materials, equipment;
- Unavailability of information;
- Disorganized work areas and lack of storage;
- Excess of rework due to not doing the first time correct;
- Bottleneck in the receipt of raw material, parts of the workshops.

The Quality Committee, in order to begin the journey towards excellence, decided to implement the "5 S", with the practical objective of reorganizing the company, seeking a better quality of life for employees, reducing waste, reducing costs and increasing productivity, according to the problems encountered by the committee. Excellence is a skill conquered through training and practice, where the activities to be developed in the company were defined:



- Training of all employees in the methodology of the "5 S", and disseminated the photos that were taken in all sectors of the company;
- Definition of "day and place of disposal";
- Definition of the "5 S" audit procedure in all sectors of the plant in order to keep the program running.

Table 2 below shows the results of the implementation of the "5 S" program in the company.

Table 2: Photos of the result of the implementation of the "5S" in the company.

Before	After
	
	

Source: Authors (2016).

#### 4.3. Analysis of production data using statistical software

The Management of the external workshops of sewing aims to increase the productivity of the company and to meet the requests of the large networks of stores and magazines on the agreed dates and in the contracted costs, with the analysis of the model that is implanted in the company, through the analysis of the indicators of performance.

The results of the improvement process implemented can be evaluated not only through the quantitative indicators proposed, but also qualitatively, considering that:

- There was a reduction of operational problems;
- There has been an improvement in the motivation of the employees, reinforcing their involvement and their interest in achieving the goals established by the company;

- There was an adjustment in the sewing process in external workshops.

Summarizing, this work proposed and implemented the "5 S" and Kaizen and measured the appropriate performance indicators in a process of sending and receiving pieces of sewing workshops according to the following analyzes:

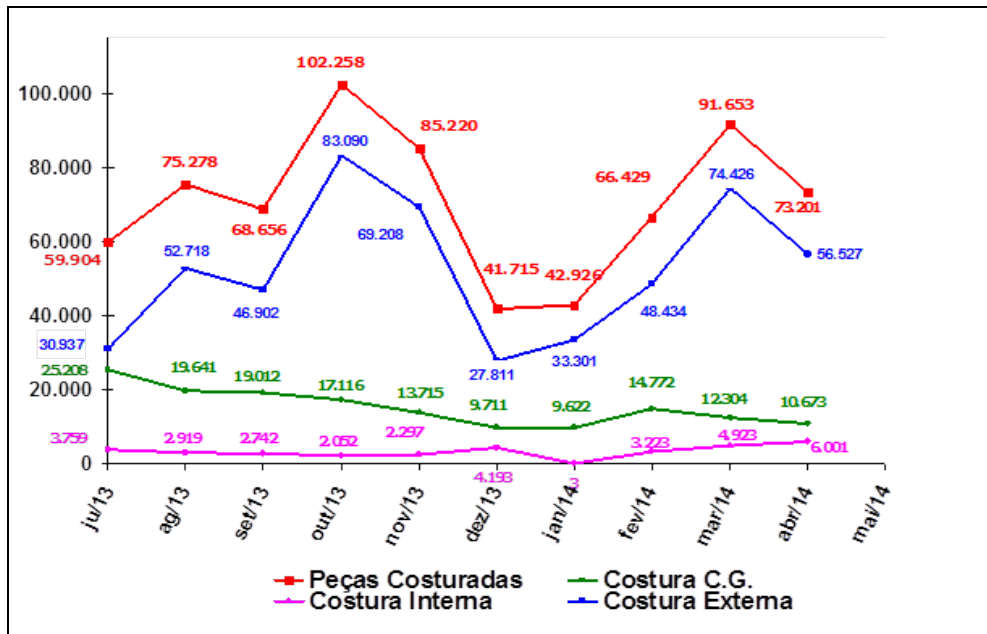


Figure 2: Graph of the total of pieces sewn.  
Source: Authors (2016).

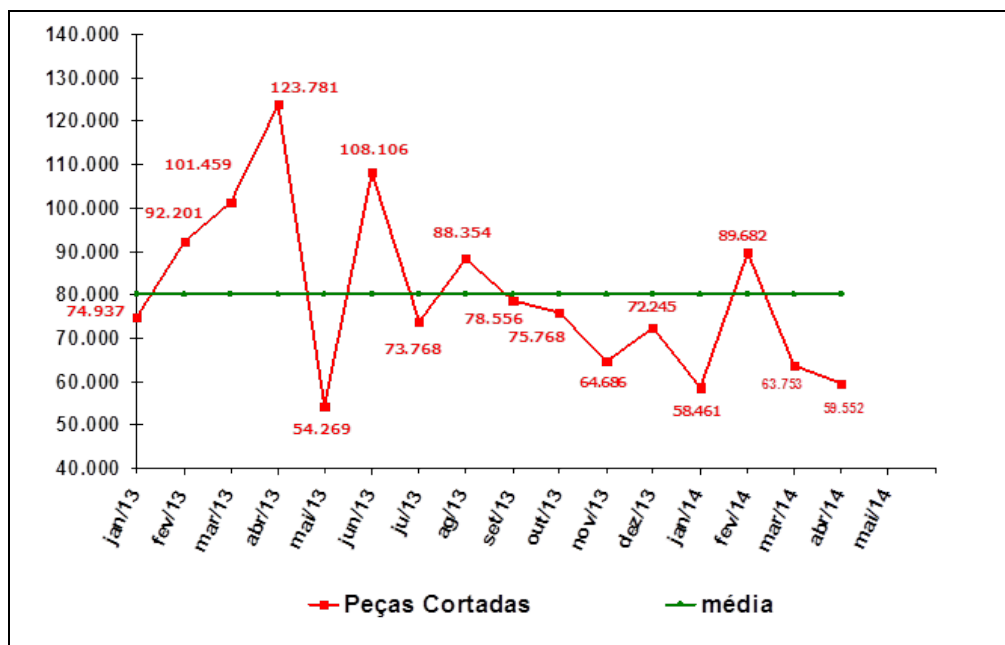


Figure 3: Graph of total cut pieces.  
Source: Authors (2016).

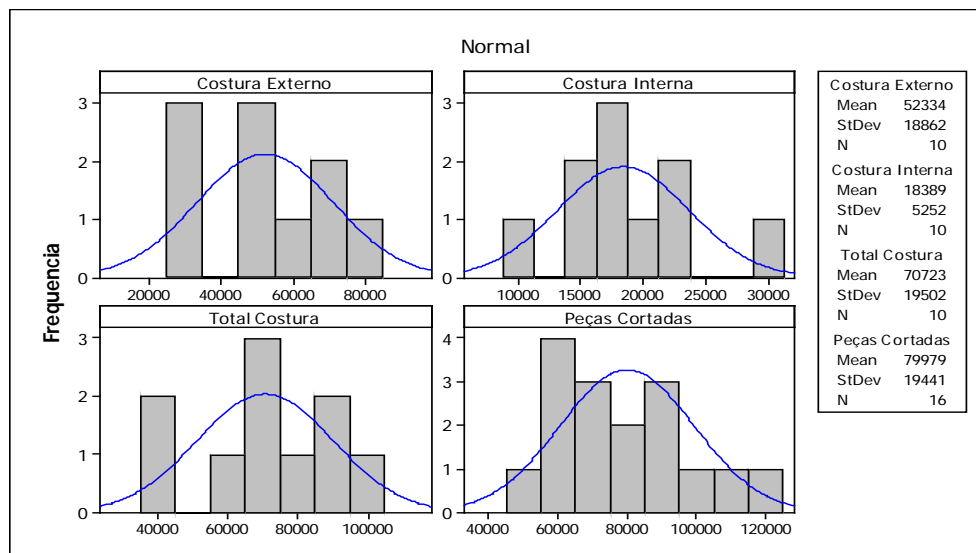
It is important to remember that figures 3 and 4 are the production data of sewn parts and cut parts that were reported in the Linx ERP system. The following is the statistical analysis of the production of sewn parts and the production of cut parts to verify that the planning module for the cutting and management of the sewing workshops are in tune to the order fulfillment.

**Table 3: Descriptive statistics; Sewing Exte; Sewing Inte; Total Costur; Cortad Parts**

Variável	Média	EP(média)	DP	Variância	Minimo	Q1	Mediana	Q3	Máximo
Costura Externa	52334	5965	18862	355779379	27811	32710	50576	70513	83080
Costura Interna	18389	1661	5252	27582349	9625	15485	17611	21956	28967
Total Costura	70723	6167	19502	380315667	41715	55660	70929	86828	102248
Peças Cortadas	79979	4860	19441	377935205	54269	63986	75353	91639	123781

(DP: desvio-padrão; Q1 e Q2: quartis; EP: erro padrão) Fonte: Autores (2016).

Note: There is a difference between the cut pieces (average of 79,979 pieces) in relation to the sewn pieces (average of 70,723 pieces), meaning a bottleneck in the operations of ironing, revision and dispatch to fulfill the orders within the agreed time.



**Figure 4: Graphic of the histogram of sewing and cut pieces.**  
 Source: Authors (2016).

Note: In Figures 5 and 6, it is observed that statistically the average of the total of sewn pieces is close to the average of cut pieces. This is also proven from the results of ANOVA (analysis of variance) given in Table 3 ( $p\text{-value} = 0.807 > 0.05$ ) where equality of averages is not rejected assuming a level of significance equal to 5%.

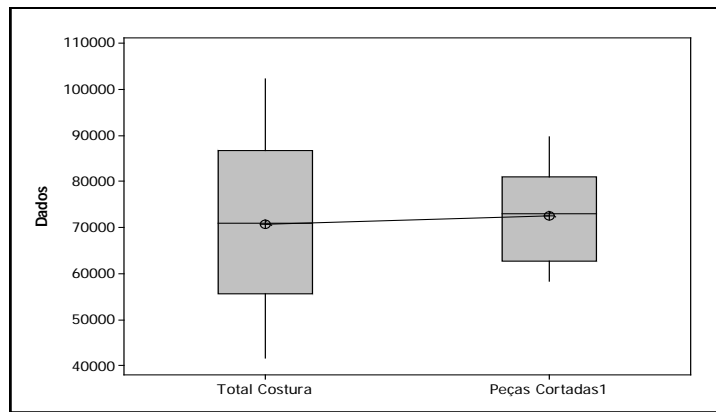


Figure 5: Sewing boxplot chart and cut pieces.  
 Source: Authors (2016).

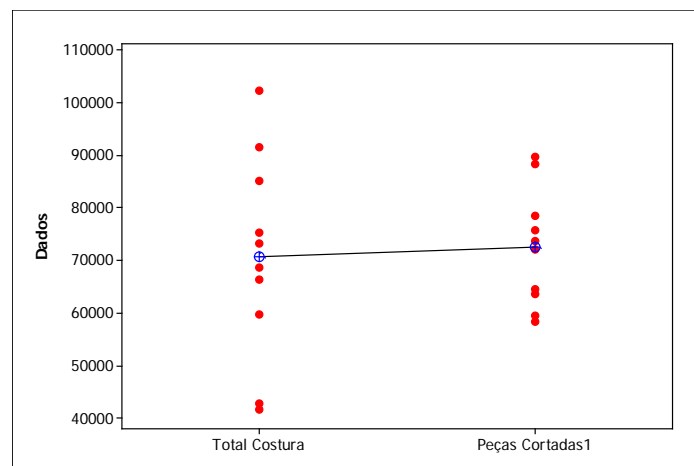


Figure 6: Graphic of the individual value of sewing and cut pieces.  
 Source: Authors (2016).

Note: From the normal probability graphs (points close to the line) of Figure 7, it is observed that data related to the production of the inner and outer seam pieces follow a normal distribution.

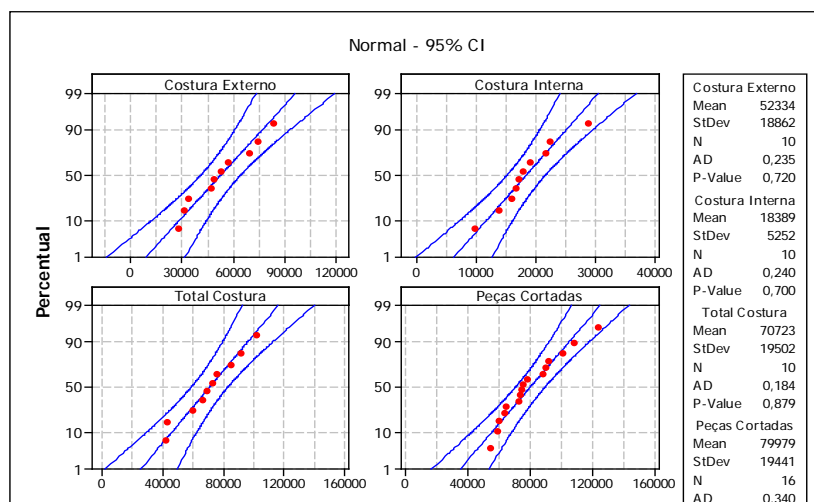


Figure 7: Plot of probability of sewing and cut pieces.  
 Source: Authors (2016).

Table 4: ANOVA with a classification: Total Sewing; Cutting Parts1

FV	GL	SQ	QM	F	P
Factor	1	15479201	15479201	0,06	0,807
Error	18	4520749018	251152723		
Total	19	4536228220			

(FV: fonte de variação; GL: graus de liberdade; SQ: soma de quadrados; QM: quadrado médio; F: distribuição F de Snedecor; P: valor-p)

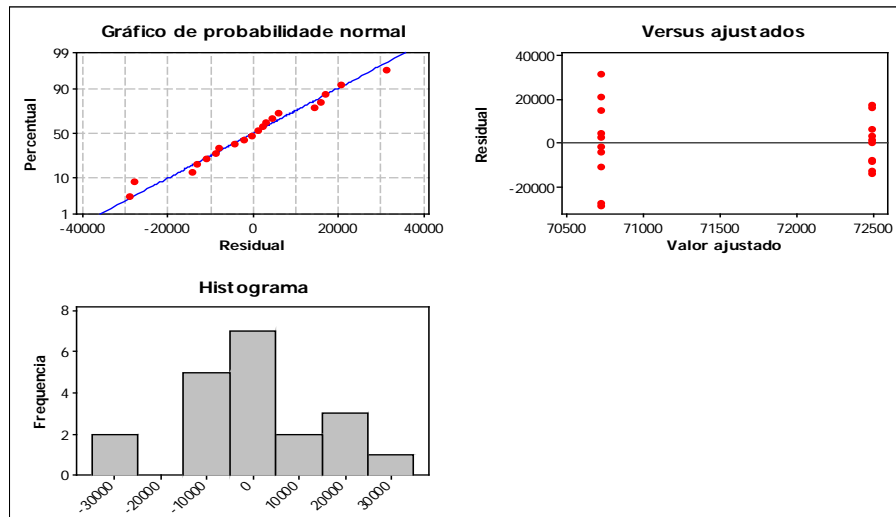


Figure 8: Plot of residual seam probability.  
 Source: Authors (2016).

Note: Assumptions of the ANOVA model (residue normality and constant variance) are verified as shown in the residue chart given in Figure 8. There is reason to say that the model is appropriate.

## 5. FINAL CONSIDERATIONS

Due to competition, companies are expanding their vision and strategic performance. Every productive process is only carried out with the participation of all, each one contributing with some resource. Employees contribute their technical knowledge, operational capabilities and skills, providing decisions that streamline organizations (SILVA; LIOTTO; BRUCH, 2011).

The implantation of the "5 S" in the company was of total importance in the management of the people and in the changes occurred in the organizational culture. According to the authors, it is necessary that everyone knows and understands the importance of "5s" and their results and that they understand, agree and comply with the requested procedures and rules, since there is only dedication when people understand and commit to what they are doing. For this was very important the participation of all in the activities, pointing needs, criticism and solutions.

The process of continuous improvement, Kaizen, is directly linked to two factors: the culture and the total involvement of top management with the participation of those responsible for the process. Based on the number of ideas suggested and implemented, the system was confirmed by the statistical results so that the company could improve its competitiveness and, why not say, to guarantee its sustainability.

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**APPENDIX A - PLAN OF ACTION**

Acronym: DI - Industrial Directorate; DC - Commercial Directorate; PCP - Production Planning and Control; AD- Administrative Assistant; CO- Control Offices; SE-Sector of Expedition; GD-Development Management; RH-Human Relationships.

Table 5: Plan of Action for case study.

ÁREA: Oficinas de Costuras		RESPONSÁVEL: Diretor Industrial		DATA: 07/04/2014				
META: Atendimento no prazo		ITEM DE CONTROLE: Atendimento no prazo						
EQUIPE: DI, DC, PCP, AD, CO, DC, SC, SE, GD, RH		FÓRMULA DE CÁLCULO:						
CAUSA		O QUE FAZER	QUEM	QUANDO	COMO	Por que	ONDE	STATUS
		(Ação ou contramedida)	(Resp.)	(Prazo)	(Detalhamento da ação)	(Motivo da ação)	(Local)	(Cor)
1	Falha de Leitura e Interpretação da Ficha Técnica	Rever a Ficha Técnica	DP	22/4	Revisando e modificando a ficha técnica, e retirando informações de clientes, compradora, prazo de entrega valor da mão de obra, colocando a referência da cor da linha de costura dos diversos fornecedores, fazendo desenho em separado da posição das etiquetas, fazendo desenho das peças com as dimensões que as facções devem contar na produção, fazendo uma tabela da quantidade de elástico, rendas, etc.	Facilitar o entendimento da peça, e a facção poder utilizar a ficha técnica no processo de costura e na revisão final.	Produto	



			DP	30/5	Fazendo o treinamento da nova ficha técnica com todas as oficinas de costuras, levando uma peça com uma ficha técnica para treinamento, com todas as informações necessárias.		Oficinas	
2	Atrasos e acúmulos nas datas de entrega dos cortes enviados a facção	Montar um planejamento e controle das oficinas de costura.	PCP	11/4	Fazendo um planejamento da capacidade das oficinas x quantidade de peças enviadas por OP's, através de um mapa de controle, de acordo com a data de entrega do pedido, e fazendo o follow-up junto às oficinas para garantir as entregas nos prazos acordados.	Estabelecer uma sistemática de planejamento, controle e cobrança das oficinas para garantir as entregas nos prazos acordados.	Dir	
			DI	30/4	Reverendo o Mapa e Fazendo a cobrança, o planejamento e envio das peças para as facções diariamente de acordo com o mapa que foi atualizado e entregue na primeira hora do expediente pela AD			
			AD	17/4	Enviando a ficha técnica por e-mail para as oficinas de costura com a indicação no e-mail das quantidades a serem produzidos, valor da mão de obra em R\$/peça e prazo de entrega, ao CO, ajustarem por telefone com a oficina.			
3	Falha no envio da peça piloto quando o envio do corte é dividido em mais de uma facção	Enviar peça piloto em todos os cortes para as oficinas de costura	CO	11/4	Enviando a peça piloto lacrada para toda a OP's, inclusive os cortes que em foram feitos à divisão em função dos prazos de entregas e das capacidades de produção das oficinas de costuras.	Evitar peças com não conformidade e dentro da qualidade esperada da empresa.	Dir	
4	Perda/falta de aviamento nas facções	Criar um procedimento para fazer conferência nos aviamentos que as facções recebem.	DC	17/4	Informando as facções que devem fazer a conferência dos aviamentos no prazo máximo de 24 horas após o recebimento dos cortes com a finalidade de informar ao CO qualquer divergência entre o que foi emitido pela empresa e o que foi recebido pelas oficinas	Estabelecer uma sistemática de contagem dos aviamentos para garantir as entregas nos prazos acordados.	Dir	
5	Falta de aviamentos nos cortes que são enviados pela empresa para a facção.	Somente enviar cortes com todos os aviamentos para as oficinas, a exceção são as etiquetas que o magazine não enviou.	DC	11/4	Estabelecendo um procedimento de enviar somente 100% dos cortes completos para as oficinas, com exceção das etiquetas que são enviadas pelos magazines, e criando um procedimento para enviar para as oficinas de costura.	Evitar excesso de transporte para a facção corte ficar parado na facção com data de entrega acordada, excesso de ligação para garantir as entregas nos prazos.	Dir	
6	Atraso no envio das amostras de produção das oficinas (10 peças) para controle na empresa.	Criar um procedimento para controle e retorno das peças de controle que foram enviadas das facções a empresa.	DC	17/4	Estabelecendo o período de 24 horas para a CO retornar as oficinas de costura sobre as 5 peças produzidas para controle (as peças devem chegar lacradas pela oficina junto com a peça piloto que foi enviada para amostra), e criando um procedimento.	Estabelecer uma sistemática de retorno das peças para aprovação do lote de fabricação para garantir as entregas nos prazos acordados.	Dir	
7	Falha na sistemática de auditoria de qualidade na facção	Rever procedimento da piloteira	DC	17/4	Fazendo um procedimento de auditoria nas facções pela piloteira com a finalidade de verificar se as peças no processo de costura estão de acordo com o padrão de qualidade da empresa, se as peças que estão prontas estão aprovadas de acordo com o plano de amostragem após a comunicação oficial as oficinas.	Estabelecer uma sistemática de inspeção das peças em processo e acabadas para garantir a entrega nos prazos acordados	Dir	

		Estruturar equipe de inspeção nas oficinas de costuras.	DI	20/5	Montando uma estrutura de inspetoras de qualidade para fazer inspeção nas oficinas de costuras das peças prontas para envio a empresa, utilizando o plano de amostragem.	Estabelecer uma sistemática de inspeção das peças acabadas para garantir a entrega nos prazos acordados	Dir	
8	Falha na sistemática de auditoria de qualidade de recebimento de peças das oficinas	Rever e estabelecer o procedimento para estabelecer critérios de aprovados ou reprovados os lotes de produção das facções.	CO	7/4	Refazendo o plano de amostragem, treinando o controle de qualidade de recebimento no novo critério de acordo com o plano de inspeção NBR 5426 (Nível geral de inspeção III, com NQA de 6,5%). Quando o lote foi aprovado de acordo com a amostragem do lote, as peças com defeitos encontradas devem ser concertadas e seguir junto com o lote para filial, ou para o processo de passadoria e inspeção final. Quando o lote foi rejeitado de acordo com a amostragem do lote, se o defeito for grave devolver todas as peças para a facção. Quando o lote foi rejeitado de acordo com a amostragem do lote, se o defeito for leve fazer a inspeção interna 100%, identificar a quantidade de peças com defeitos para serem concertadas internamente ou retornar para a facção de acordo com a data de faturamento do pedido,	Estabelecer uma sistemática de inspeção para todos os magazines e os critérios de aprovação e rejeição dos lotes recebidos das facções.	CQ	
9	Falha no procedimento de desconto das peças que foram rejeitadas pelo controle de qualidade	Rever e estabelecer os procedimentos e critérios de desconto das peças que precisam ser concertadas	DC	17/4	Fazendo um procedimento de desconto das peças que precisaram ser revisadas 100% pois foram rejeitadas no CQ de recebimento e no concerto interno ou externo das peças que foram retiradas da inspeção	Estabelecer uma sistemática de punição das oficinas que enviaram peças com problemas de qualidade para garantir as entregas nos prazos acordados.	Dir	
10	Falta de informação da queda de venda para as facções	Informar as oficinas da redução das peças a serem costuradas	DC	30/5	Informando ao DI que em função das vendas as facções num período determinado a produção vai ser reduzida e as mesmas podem dar férias a seus funcionários ou pegar serviços de outros fornecedores	Estabelecer uma sistemática de programação de produção junto com as oficinas de costura.	Dir	
11	Falta de uma rota antecipada dos motoristas para as facções	Racionalizar o uso do transporte para o atendimento das facções.	SE	17/4	Fazendo o planejamento do transporte em função do mapa de controle das facções que devem priorizar as datas de entregas e envio de novos cortes para o atendimento dos pedidos.	Diminuir o custo do transporte, e garantir as entregas dos pedidos nos prazos.	Expedição	
12	Falha no comportamento dos funcionários da empresa junto às facções	Criar um canal de comunicação	DC	17/4	Fazendo um e-mail (ouvidoria@empresa.com.br) para receber os comunicados das facções com problemas de comportamento dos funcionários da empresa. O RH deve filtrar os e-mail e procurar meios de resolver estes conflitos	Estabelecer uma sistemática de comunicação com as oficinas de costura para problemas de comportamento	Dir	
13	Falta de um critério de premiação das facções	Estimular as oficinas de costura a entregar dentro dos prazos acordados e na qualidade requerida.	DI	30/6	Fazendo um estudo de premiação das oficinas que entregarem na data acordada, na qualidade exigida dentro do plano de amostragem e montagem de um critério de avaliação para a substituição das oficinas problemáticas.	Garantir as entregas dos pedidos nos prazos e na qualidade esperada.	Dir	
14	Falha de corte no tecido chifon, com	Fazer e cortar o enfeito corretamente	SC	25/4	Fazendo o treinamento e auditoria pelo SC nos cortes de chifon para garantir o método correto de enfeitar e cortar, e utilizando régua de madeira para evitar	Aumentar a produtividade das oficinas de costura e garantir	Corte	

	diferenças de medidas para a costura.				problemas no corte.	as entregas nos prazos acordados.		
1 5	Perda de produtividade e na costura em função do envio do viés em pedaços para cada operação de costura.	Rever a modelagem das peças	GD	17/4	Fazendo constar no risco a soma de todas as peças de viés com uma perda estimada de 5%, e ajustando o consumo para efeito de custo.	Aumentar a produtividade das oficinas de costuras em função de diminuir as emendas de viés e evitar desperdício.	Desenvolvimento	