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INTEGRATING TIMES AND METHODS WITH KANBAN - A CASE STUDY IN THE AUTOMOTIVE INDUSTRY

INTEGRAÇÃO DE TEMPOS E MÉTODOS COM KANBAN - UM ESTUDO DE CASO NA INDÚSTRIA AUTOMOTIVA

INTEGRANDO TIEMPOS Y MÉTODOS CON KANBAN: UN ESTUDIO DE CASO EN LA INDUSTRIA AUTOMOTRIZ

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ABSTRACT
The automotive industry is characterized by its high complexity and the need for highly efficient and flexible production processes. In this context, the integration of classic tools, such as time and method studies, with lean manufacturing practices, such as the Kanban system, constitutes a relevant strategy for identifying bottlenecks, reducing waste, and increasing competitiveness. This article aims to analyze the combined application of chronoanalysis and Kanban in an automotive wiring harness production cell, seeking to understand their impact on line balancing and improving production flow. Methodologically, this is an exploratory case study with a quantitative approach, developed through the collection of operating time data, mapping of supply routes, and the implementation of Kanban cards and boards. The results show that, prior to the intervention, production stations operated above takt time, compromising efficiency. With the introduction of the Kanban system, combined with the standardization achieved through chronoanalysis, there was a significant reduction in waste, elimination of inappropriate activities, and improvement in cell balancing, with all stations operating within takt time and fatigue limits. As a contribution, the study demonstrates the practical applicability of the integration between classical methods and Lean tools, reinforcing its relevance for continuous improvement. Furthermore, it highlights the need for future research on the digitalization of Kanban (e-Kanban) and its integration into smart production environments, aligned with the principles of Industry 4.0.

Keywords: Lean Manufacturing. Automotive Industry. Chronoanalysis. Kanban. Line Balancing.

RESUMO
A indústria automotiva caracteriza-se por sua elevada complexidade e pela necessidade de processos produtivos altamente eficientes e flexíveis. Nesse contexto, a integração de ferramentas clássicas, como estudo de tempos e métodos, com práticas de manufatura

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enxuta, como o sistema Kanban, constitui uma estratégia relevante para identificar gargalos, reduzir desperdícios e aumentar a competitividade. Este artigo tem como objetivo analisar a aplicação conjunta da cronoanálise e do Kanban em uma célula de produção de chicotes automotivos, buscando compreender seu impacto no balanceamento da linha e na melhoria do fluxo produtivo. Metodologicamente, trata-se de um estudo de caso exploratório, com abordagem quantitativa, desenvolvido por meio da coleta de dados de tempos de operação, mapeamento de rotas de abastecimento e implementação de cartões e quadro Kanban. Os resultados evidenciam que, antes da intervenção, os postos produtivos operavam acima do takt time, comprometendo a eficiência. Com a introdução do sistema Kanban, aliada à padronização obtida pela cronoanálise, houve significativa redução de desperdícios, eliminação de atividades indevidas e melhoria no balanceamento da célula, com todos os postos passando a operar dentro do takt time e do limite de fadiga. Como contribuição, o estudo demonstra a aplicabilidade prática da integração entre métodos clássicos e ferramentas Lean, reforçando sua relevância para a melhoria contínua. Além disso, aponta para a necessidade de futuras pesquisas sobre a digitalização do Kanban (e-Kanban) e sua integração a ambientes produtivos inteligentes, alinhados aos princípios da Indústria 4.0.

Palavras-chave: Lean Manufacturing. Indústria Automotiva. Cronoanálise. Kanban. Balanceamento de Linha.

RESUMEN

La industria automotriz se caracteriza por su alta complejidad y la necesidad de procesos de producción altamente eficientes y flexibles. En este contexto, la integración de herramientas clásicas, como los estudios de tiempos y métodos, con prácticas de manufactura esbelta, como el sistema Kanban, constituye una estrategia relevante para identificar cuellos de botella, reducir desperdicios y aumentar la competitividad. Este artículo busca analizar la aplicación combinada de cronoanálisis y Kanban en una celda de producción de arneses de cableado automotriz, buscando comprender su impacto en el balanceo de la línea y la mejora del flujo de producción. Metodológicamente, se trata de un estudio de caso exploratorio con un enfoque cuantitativo, desarrollado mediante la recopilación de datos de tiempos de operación, el mapeo de rutas de suministro y la implementación de tarjetas y tableros Kanban. Los resultados muestran que, antes de la intervención, las estaciones de producción operaban por encima del tiempo takt, lo que comprometía la eficiencia. Con la introducción del sistema Kanban, combinada con la estandarización lograda mediante el cronoanálisis, se logró una reducción significativa del desperdicio, la eliminación de actividades inapropiadas y una mejora en el balanceo de la celda, logrando que todas las estaciones operen dentro de los límites de tiempo takt y fatiga. Como contribución, el estudio demuestra la aplicabilidad práctica de la integración entre métodos clásicos y herramientas Lean, reforzando su relevancia para la mejora continua. Además, destaca la necesidad de futuras investigaciones sobre la digitalización de Kanban (e-Kanban) y su integración en entornos de producción inteligentes, en línea con los principios de la Industria 4.0.

Palabras clave: Manufactura Lean. Industria Automotriz. Cronoanálisis. Kanban. Balanceo de Línea.

1 INTRODUCTION

The automotive industry is recognized for its complexity and the need for high levels of efficiency and productivity. In this sense, the identification of possible opportunities for improvement in processes has become routine within organizations. According to Corrêa and Gianesi (2011), one of the main aspects that organizations should be concerned with is improving operational efficiency. Thus, it is extremely necessary for organizations that their production systems have maximum effectiveness, increased productivity, reduced losses, rationalized use of available resources and standardization of tasks, thus ensuring the highest possible profitability.

To achieve these objectives, the study of times and methods, the timing of operations and the use of Lean Manufacturing practices have proven to be fundamental. These are essential for the improvement of production processes, ensuring the reduction of waste, increased efficiency and continuous improvement.

In the context of the automotive industry, the study of times and methods plays a crucial role in the analysis and improvement of production processes. Through detailed observation of the activities carried out by employees, it is possible to identify activities that generate waste of time, unnecessary movements, or underutilization of resources. Operations timing, on the other hand, allows for a detailed analysis of the execution time of each activity, allowing the establishment of more efficient work patterns and the elimination of unnecessary activities.

One of the most widely used practices in Lean Manufacturing is Kanban, which in turn, is a visual workflow management tool that plays an essential role in the automotive industry. Through the use of cards or visual signs, Kanban allows the control of the flow of materials and information along the production lines.

In this article, the importance of these three elements in the automotive industry will be explored, highlighting their benefits and positive impacts on the quality and competitiveness of the sector. Initially, the study of times and methods together with timing will be used to make a detailed analysis of the processes and activities in a production cell of automotive harnesses of the sedan line. In a second moment, after the analysis of the cell's production times and methods, kanban will be implemented in order to facilitate operational management and reduce inventories in the process. As a result, the objective is to have a clear view of the status of activities, allowing a quick response to possible problems, reducing inventory and ensuring just-in-time production.

For this, in addition to this brief introduction, in item 2, the article presents a review of the literature on the main themes of the research, in item 3, it presents the methodology, in item 4, it presents the case study; Finally, in item 5 the conclusion of the present work is presented.

2 STUDY OF TIMES AND METHODS

The study of times and methods plays a key role in production engineering. It is related to the analysis and optimization of work processes, seeking to improve efficiency, productivity, and quality in an organization. The study of times and methods had its beginnings at the Midvale Steel Company mill, where Frederick W. Taylor identified the inability of management to carry out the proper division of labor for labor. Dating from this assumption, Taylor began his research by choosing two healthy and efficient workers; seeking to stipulate the fraction of energy that a man could spend in a day's work (TAYLOR, 1970).

Through the research conducted by Frederick W. Taylor, it became apparent that the control of the energy expended by a man was linked with the duration of the frequency and periods of work and rest. Taylor sought to teach the correct way to carry out the activities, focusing on making it easier for the worker to carry them out; stipulated times and standardization of processes. (TAYLOR apud BARNES, 1977).

According to Furlani (2011), times and methods is an analysis of a system, which presents identifiable points of entry, transformation and exit; affirming standards to facilitate decision-making. In this way, it favors efficiency and effectiveness through the times and information obtained, making it possible to decide the best method to be used in solving problems in production lines.

2.1 CHRONOANALYSIS

The chronoanalysis began with Frederick W. Taylor's studies on the divisions of operations in a production process, and the real capacity of the operator. Frank Gilbreth also provided a study on the part of movements encompassing aspects related to fatigue, economy of unnecessary movements, where a table of movements and their respective values and symbols was created (SUGAI, 2003).

According to Toledo Jr (1977, p. 19), "Chronometry is the calculation, the mechanical act of

get to Standard Time. Chronoanalysis is tabulation, it is the art of using standard time, aiming at improving the working method".

Chronoanalysis is indicated when there is a need to improve productivity and understanding of the process, through which the inept points of the process are identified.

Enabling the solution of bottleneck problems and thus increasing productivity (OLIVEIRA, 2015).

To carry out the chronoanalysis, Barnes (1997) defined seven steps:

1º Obtain and record information about the operation and the operator under study;

2nd Divide the operation into elements;

3º Observe and record the time spent by the operator;

4º Determine the number of cycles to be timed;

5º Evaluate the operator's pace;

6º Determine tolerances;

7º Determine the standard time for the operation.

When choosing the operator, it is necessary to choose the operation that will be the timekeeping sample of the study.

2.2 LEAN MANUFACTURING AND ITS OPERATIONAL PERFORMANCE

According to the book "Operational Excellence with *Lean Manufacturing*" by Felipe Martins Pantazis Gracia (2020), Taylor who started with production organization techniques, but it was Henry Ford who carried out work with the objective of formalizing and methodizing serial production, applying the scientific method of processes, times, teams, people and contributing to the construction of the model, which enabled Eiji Toyoda together with Taiichi Ohno to develop Toyota's own production system (TPS), which would come to be known worldwide as *Lean Manufacturing,* with the objective of increasing productivity, doing more with fewer resources and suppressing sources of waste along the value chain.

The implementation of lean manufacturing began in Japan and was soon implemented in the United States of America in the automotive industries and became almost an obligation in this sector to remain competitive (WOMACK, JONES, 1998).

Lean Manufacturing has five principles as shown in the figure below:

Figure 1

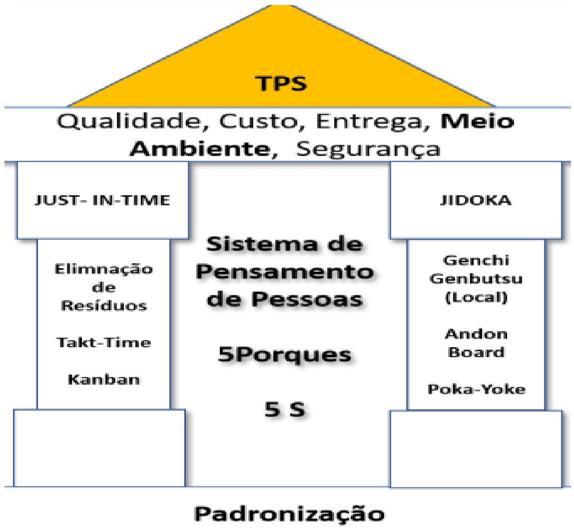
Lean thinking guiding principles

Source: Womack and Jones (1998)

To reinforce the foundation, the quote from Ohno is valid, who said that *lean manufacturing* is about visualizing the time of the process as a whole, from customer demand to the invoicing of the sale value and in turn reducing this time, removing waste and processes that do not add value (OHNO, 1999). To consolidate his speech, Bandeira (2021) also cites some big names in the market as companies that had good results adopting *lean concepts*, such as: Ford, Nike, Toyota, and Caterpillar.

FIGURE 2

The pillars of the TPS



Source: Hermman (2008)

In order to facilitate the propagation of the Toyota Production System, a diagram called "STP House" was created, this diagram was adapted by Hermman presenting the essential pillars of the Toyota Production System being represented in figure 3 below.

The pillars are presented by two methodologies, one is *JIDOKA,* which consists of the automation of assigning power to the system to stop production without human intervention if it detects that it cannot make a part without errors, while the other pillar, *Just in time,* is basically the organization of production in producing the correct quantity at the given time (OHNO, 1997). Above the pillars, there is the roof that represents the goals, which are: better quality, lower cost, shorter *lead time*, sustainability and safety of people in this system. At the base of the house, there is standardization, which is very important for serial and quality production (LIKER, 2016).

2.3 KANBAN

According to Anderson, D. J. (2010), the effective management of work processes is crucial for industrial organizations to achieve high productivity, quality and competitiveness. In this context, *Kanban* emerges as a visual management tool that

It helps manage workflow, optimize operations, and reduce waste. *Kanban* has its roots in the Toyota Production System and uses cards or visual cues to control the workflow. This approach provides a clear view of ongoing tasks, helps identify bottlenecks, and promotes continuous improvement. In addition, *Kanban* limits the amount of work in progress, prevents overload, and encourages completing tasks before starting new ones.

The implementation of *Kanban* in the industry requires a careful analysis of existing work processes and the definition of customized *Kanban* boards for each stage of the production flow. This visual system makes it easy for team members to communicate, track the progress of tasks, and quickly identify problems. *Kanban* also promotes standardization and collaboration, leading to a more efficient and accountable work environment (HAMMARBERG, 2014).

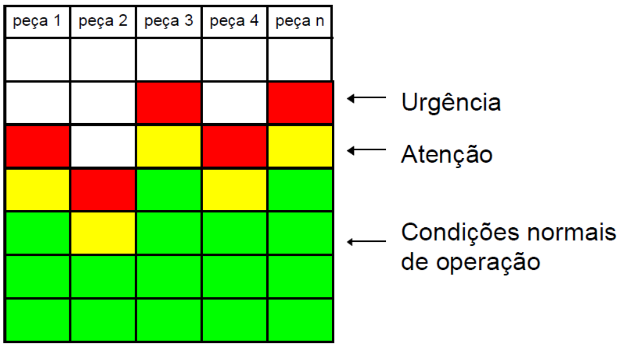
Visual control is the basic concept of the Kanban system, whose main objective is to enable *"Just in Time"* production through visual control of production and inventory through visual cards that indicate the need to exchange materials and products. The term "*kanban*" means "vision board" in Japanese (OHNO, 1997).

According to Rocha and Sousa (2021), the *Kanban system* brought a great development to production management, allowing the visualization of data at the end of the process in a well-established way for the movement and generation of products, leading to *Just in Time*. Production, that is, at the right time and in the necessary quantity, which reduces inventory and minimizes costs and waste. *Kanban* uses cards to authorize the production and movement of products during the production process.

According to Artia (2022), the main functions of the *Kanban* system are workflow control, visualization of the production system for managers, balancing processes to avoid interruptions, and limiting the volume of work so that production continues in a tight manner. The traditional kanban system uses signage panels or boards, as shown in figure 4, called kanban door boards, next to the storage points scattered throughout the production, with the purpose of signaling the flow of movement and consumption of items from the fixation of kanban cards, as shown in figure 3. These dashboards are part of the broader concept of visual management.

Figure 3

Kanban board



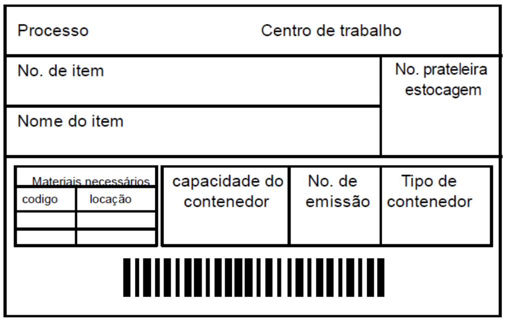
Source: Tubino (2017)

The *kanban system* works based on the use of signage to activate the production and movement of items through the factory. Conventional *kanban* cards are made of durable material to withstand the handling resulting from the constant turnover between the customer's and the item's supplier's inventories.

The figure below shows an example of a *kanban card*.

Figure 4

Kanban card



Source: Tubino (2017)

3 METHODOLOGY

According to Gil (2002), research is classified according to its general objectives, and can be classified according to three aspects, such as: exploratory, descriptive and explanatory research; it can also be classified according to the approach to the problem, as qualitative or quantitative. The present case study is classified as exploratory, and in order to achieve the objective of the research, the quantitative approach was used, as numerical data was used, due to the study of times and methods on the factory floor.

The cell in question was chosen due to the notable unbalance of the line, which generated station delays, bottlenecks and as a result could not remove the parts programmed daily. The method used was chronoanalysis, and through the use of this method it was possible to analyze the problems of the production cell.

For Oliveira (2009, apud CHIROLI, 2011) chronoanalysis is a method with the objective of timing the execution time of a certain task in the production flow, therefore, the analysis of tolerance times is carried out according to the physiological needs of the operator, and also, the need for the *takt time* of the line, thus eliminating, any and all waste and idleness.

The chronoanalysis data were collected manually, with a stopwatch, paper and pen; From there, they were transferred to an electronic spreadsheet, where the results of each station were analyzed.

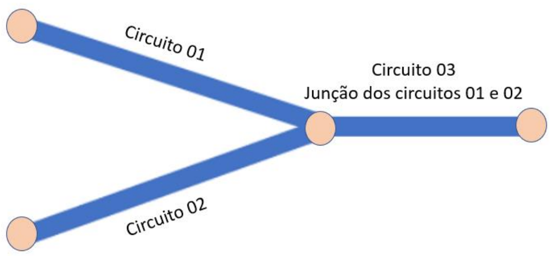
Through the analysis of times and methods, other problems were found, such as carrying out an activity that was not determined, production without splice control. Being solved with the application of the *Kanban* system, with identification plates and control board. At the end of this work, the problems found in the process were exposed, finally solving them.

4 APPLICATION OF THE CASE STUDY

The present research was applied in a cell of production of automotive harnesses, where each stage of the process is separated into different production stations. The cell selected for the case study has three machines to produce special automotive circuits (*splice*), which is considered special because it is formed by joining two or more circuits into one (figure 5).

Figure 5

Illustration of a conventional splice: 2 against 1



Source: Authors (2023)

The machines that produce *splices* are responsible for producing parts for 7 production stations in the same cell. Through the chronoanalysis, it was observed that the operator of one of these 7 stations was refueling the splice, that is, going to the machine and taking it to his station. In addition, it was later identified that all the stations that needed *splice* were doing the same operation, that is, performing an activity that was not being considered for their station. Therefore, through this time analysis, the waste of time and unnecessary locomotion of the operator was verified, and with the completion of the chronoanalysis, it was diagnosed that the workstations were unbalanced.

During the chronoanalysis, 3 times were timed in which the operators moved to look for the circuit in the *splice machines* and supply them, in addition to performing the activities predetermined for them. Figure 6 shows the chronoanalysis carried out at these seven production stations.

Figure 6

Chronoanalysis report - before

CRONOANÁLISE

Pág. 1 de 2

Data:

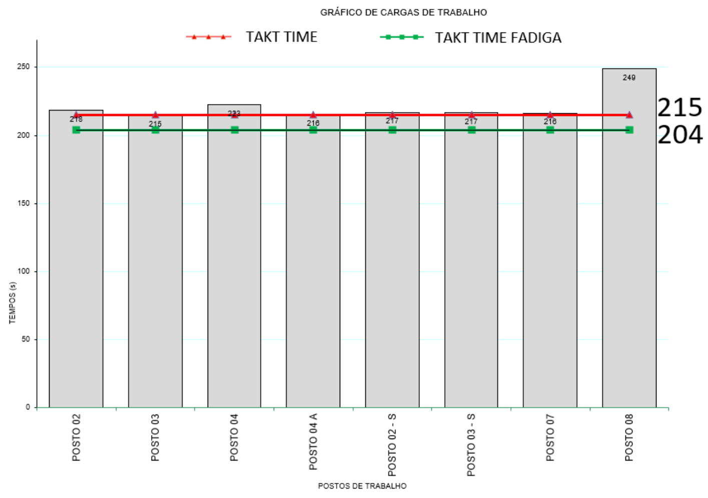
Célula:	1	Tempos do Ciclo ☑ segundos ☐				Tempo Médio	Classif. Ritmo (%)	Tempo Permitido
Posto	**Descrição do Posto**	**1**	**2**	**3**	**10**			
POSTO 02	conectagem	221,0	217,0	217,0		218,3	100	**218,3**
POSTO 03	conectagem	222,0	212,0	211,0		215,0	100	**215,0**
POSTO 04	conectagem	223,0	220,0	225,0		222,7	100	**222,7**
POSTO 04 A	conectagem	221,0	217,0	209,0		215,7	100	**215,7**
POSTO 02 - S	conectagem	232,0	220,0	199,0		217,0	100	**217,0**
POSTO 03 - S	conectagem	232,0	208,0	210,0		216,7	100	**216,7**
POSTO 07	conectagem	209,0	217,0	223,0		216,3	100	**216,3**
POSTO 08	conectagem	254,0	249,0	244,0		249,0	100	**249,0**
						TOTAL		**1770,7**

Source: Authors (2023)

The figure above shows the chronoanalysis report, with the timed times in seconds and the *takt time* of the production cell (215 seconds). It was found that the times of all the productive stations are above the *takt time* determined for the cell. In addition to the concern about the imbalance of these stations, caution is needed due to the *takt time* of fatigue of the productive stations, which for this specific cell is 204 seconds. Figure 7 below presents the results of the chronoanalysis.

Figure 7

Chronoanalysis figure - before



Source: Authors (2023)

From these data, the problem was communicated to the logistics area, which is responsible for the supply of circuits, and a table was developed with all the *splices* that the stations use and the timing of the supply of each *splice* was carried out in the respective production stations (Figure 8).

Figure 8

Splice mapping worksheet

MAPEAMENTO SPLICE

POSTO	CÓDIGO	PASSO	TEMPO (S) (PASSOS+PEGAR AS SPLICES)
POSTO 02	X1.00	21	00:00:36
POSTO 03	X1.01	16	00:00:31
POSTO 03	X1.02	16	00:00:31
POSTO 03	X1.03	16	00:00:31
POSTO 03	X1.04	16	00:00:31
POSTO 03	X1.05	16	00:00:31
POSTO 03	X1.06	16	00:00:31
POSTO 03	X1.07	16	00:00:31
POSTO 03	X1.08	16	00:00:31
POSTO 03	X1.09	16	00:00:31
POSTO 03	X1.10	16	00:00:31
POSTO 03	X1.11	16	00:00:31
POSTO 03	X1.12	16	00:00:31
POSTO 04	X1.13	13	00:00:28
POSTO 07	X1.14	7	00:00:22
POSTO 04A	X1.15	11	00:00:26
POSTO 04A	X1.16	11	00:00:26
POSTO 04A	X1.17	11	00:00:26
POSTO 04A	X1.18	11	00:00:26
POSTO 04A	X1.19	11	00:00:26
POSTO 04A	X1.20	11	00:00:26
POSTO 04A	X1.21	11	00:00:26
POSTO 04A	X1.22	11	00:00:26
POSTO 04A	X1.23	11	00:00:26
POSTO 04A	X1.24	11	00:00:26
POSTO 04A	X1.25	11	00:00:26
POSTO 04A	X1.26	11	00:00:26
POSTO 04A	X1.27	11	00:00:26
POSTO 02 - S	X1.28	30	00:00:45
POSTO 02 - S	X1.29	30	00:00:45
POSTO 02 - S	X1.30	30	00:00:45
POSTO 02 - S	X1.31	30	00:00:45
POSTO 02 - S	X1.32	30	00:00:45
POSTO 03 - S	X1.33	16	00:00:31
POSTO 03 - S	X1.34	16	00:00:31
POSTO 03 - S	X1.35	16	00:00:31
POSTO 03 - S	X1.36	16	00:00:31
POSTO 03 - S	X1.37	16	00:00:31
POSTO 03 - S	X1.38	16	00:00:31
POSTO 08	X1.39	41	00:00:56
QUANTIDADE DE POSTO	QUANTIDADE SPLICE	PEÇAS P/ HORA	TAKT TIME DA LINHA
7	40	16,2	215 s

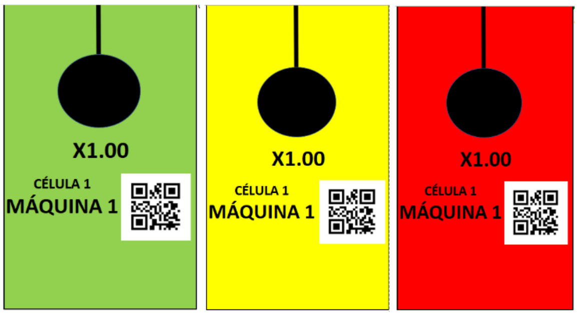
Source: Authors (2023)

The first column of figure 8 is the identification of the production station that uses the *splice*, the second is its code, the third column is the number of steps traveled from the allocation of *splices* to the production station and the last is the conversion of steps into seconds, considering that each step is equivalent to 1 second. The figure also informs the number of production stations, number of *splice configurations*, parts produced per hour by the cell and *takt time* of the line.

When working to rebalance the line, it was observed that the operators of the *splice* machines did not have any visual guidance of when they need to produce a certain *splice*, and thus, it became necessary to apply the *Kanban system*. With the splice mapping spreadsheet, it was possible to analyze all the circuit configurations that the machine produces and that the production station needs, therefore, all *splices* were identified with *kanban cards* (Figure 9).

Figure 9

Kanban cards



Source: Authors (2023)

Kanban cards contain the *splice code*, the cell and the machine it produces, in addition to having a QR code, where the supplier reads the *QR code* and receives information about the place to refuel, in addition to having the help of the *splice* configuration notebook (Figure 10). The *Kanban system* was divided into three colors: green (normal consumption), yellow (attention) and red (urgency). Considering that the production cell produces 16.5 pieces per hour, and the *splices* are allocated by bundles of 10 pieces, that is, two bundles of *splices* would be with green cards, as they would have a *safety buffer* to produce one hour; a bundle of pieces would have a yellow card, attention is needed; finally, another bundle of pieces with the red card.

Figure 10

Splice configurations notebook

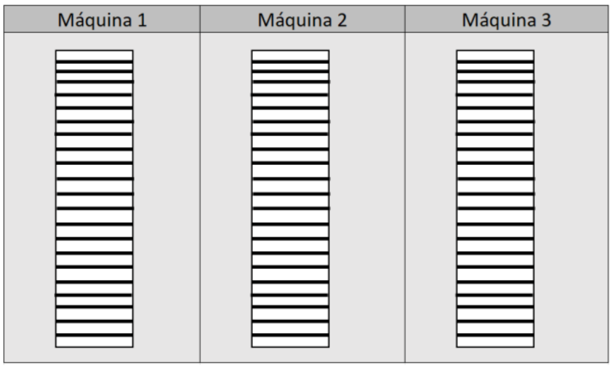
Derivativo	
Célula 1	Posto 03
CÓDIGO	
X1.00	

Source: Authors (2023)

In addition to the *Kanban* cards, a board was prepared (Figure 11), so the operator can easily and effectively identify the *samples* he needs to produce, avoiding producing without demand and even causing a line stop due to lack of circuit.

Figure 10

Kanban Board



Source: Authors (2023)

The *Kanban board* has three columns, dividing the three machines that produce the *splice* to the cell, working in the following logic:

1. The supplier being activated from the given *splice*, will go to the allocation of splices, check according to the identification and get the *desired splice*;
2. With the *splice* in hand, you will check the machine you produced on the kanban card, remove the card and place it on the board as declared on the card;
3. Finally, you will put it in your circuit supply car and make the supply route normally.

After defining this flow using *kanban*, the implementation took place in the production cell. A great improvement in the balancing of the production cell was evidenced, specifically in the 7 production stations (Figure 11), in addition, there was greater control of the production of these certain circuits (*splices*).

Figure 11

Chronoanalysis report - After

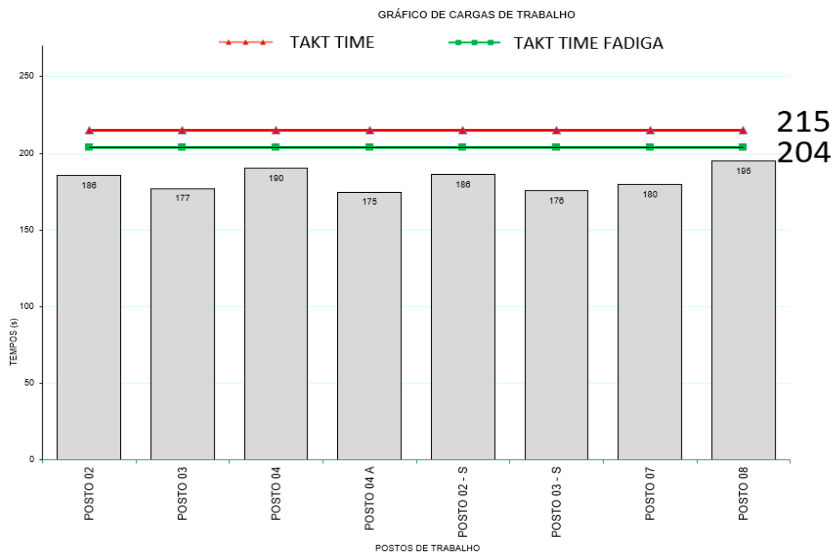
CRONOANÁLISE									Pág. 1 de 2 / Data:
Célula:	1	Tempos do Ciclo ☑ segundos ☐				Tempo Médio	Classif. Ritmo (%)		Tempo Permitido
Posto	Descrição do Posto	1	2	3	10				
POSTO 02	conectagem	191,0	181,0	185,0		185,7	100		185,7
POSTO 03	conectagem	173,0	167,0	191,0		177,0	100		177,0
POSTO 04	conectagem	195,0	183,0	193,0		190,3	100		190,3
POSTO 04 A	conectagem	172,0	179,0	173,0		174,7	100		174,7
POSTO 02 - S	conectagem	196,0	187,0	175,0		186,0	100		186,0
POSTO 03 - S	conectagem	170,0	177,0	180,0		175,7	100		175,7
POSTO 07	conectagem	176,0	195,0	168,0		179,7	100		179,7
POSTO 08	conectagem	196,0	188,0	201,0		195,0	100		195,0
						TOTAL			1464,0

Source: Authors (2023)

The figure above shows the chronoanalysis report, which shows the timed times in seconds. It was found that the times of all production stations are below the *takt time* determined for the cell, showing improvement in the balance of the production cell, due to the withdrawal of the supply activity, where it used to consume 56 seconds of the operator's time. All the positions were both below the *takt time* of the line, and the *takt time* of fatigue, as shown below in Figure 12.

Figure 12

Chronoanalysis Figure – After



Source: Author (2023)

Based on the data presented, it is proven that chronoanalysis is an efficient and effective tool, as it makes it possible to observe the problems of the line and thus seek to solve them.

5 FINAL CONSIDERATIONS

The objectives of the present study were satisfactorily achieved. With the applications of time study, analysis and *kanban system* , statistical data were obtained, through chronoanalysis within the production process of automotive harnesses, making it possible to have a broad view of the entire process and at the same time detailed, being possible to identify and apply several points of improvement in the production process, avoiding waste of operator time and unnecessary production.

The *takt time* of the line and the *takt time* of fatigue were considered, proving that the production cell was unbalanced and performing an improper activity. From the technical analysis supported by scientific methods, it was possible to present the problem to the management, showing the unnecessary locomotion of operators of 7 production stations and also the overproduction of *splices*. With a review of the literature it was considered that the best technique for this problem was *kanban,* with its application it became feasible to organize and control the production of *splices*, avoiding *downtime* in the production cell. Another point is the balancing of the production stations, where all 7 production stations, after the applied improvement, were both below the *takt time* of the production cell and the *takt time* of fatigue, later avoiding muscular problems of operators.

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