

Original Article

Activity Analysis Of Production Bottleneck (TOC) In A Slaughter House Refrigerator From State Of Mato Grosso (Brazil)

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ABSTRACT

It is very important that the decision makers really know the operation of the production line in time to make decisions, so that misunderstandings of not run and the problem persists. Here the case study was conducted in the cattle slaughter house refrigerator located in the State of Mato Grosso (Brazil), which presented problems related to the production line imbalance, false bottlenecks and pointing accuracy of this imbalance on long drives. Thus by the study is possible to solve the problems through the application of the five steps of TOC, the organizing company with investments in ideal locations attacking the real problems and increasing productivity and managerial constraints.

Keywords:

Management, Constraints, Productivity, Slaughter House .

Introduction

In the business environment, it is important that the decision-makers have accurate information about the performance of the activities. In this way, it is important that the organization makes an analysis of their production line identifying its weaknesses, with the goal of coming to correct. AND really see if at this point it is necessary to make any changes that best fits the carrying out of the activity.

It is not simply see if an activity is delaying the activities subsequent to the production line. For this reason, it has to be done a study of this point of bottleneck and see the true reason that prevents the good performance of the production line.

Can the real problem may not be the job that seems to be, and yes be masked behind other previous activities that were not well performed, or performed at inappropriate time (advancing the tour next job, in the case of a production line for a slaughterhouse fridge of cattle object of this study).

Thus we can see how much time the company was stopped by lack of equipment, skilled labor or the lack of employees on the production line interferes with the good performance of other activities and productivity respectively.

Once identified the causative agent of the problem, it is evident that the right is not troubleshoot the effect, but the cause, avoiding future impairments and eliminate this problem, allowing the efficiency of this activity.

In decision-making should be analyzed the advantages and disadvantages according to the needs of the company at the time of choosing a change in the production line, or hiring new employees. Thus the data provided has to be trusted to make a decision of business to improve the efficiency of the same.



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Objective

The objective of this work is to evaluate and quantify the impairments or operating mechanical and their reasons, and propose improvements if necessary.

The secondary objectives of the study are: to Identify the impairments on the production line; Identify the false points of impairments, those who stop only for reasons of its antecedents; analyze the possibility of the creation of new jobs; assess the efficiency and benefit of hiring labor; assess the possible exchange of equipment through the comparison of the possible results.

Background

Check and analyze the organization and to identify the problems and the activities that are not performed correctly or in its proper time, to provide important information during the decision-making process. what seems to be a problematic point with numerous interruptions can be hidden behind an activity that seems to be going perfectly, and, to address this restriction, we have to move in their previous activities, and thus avoid unnecessary changes.

The important thing is not so much the effect, but the cause. Once you have identified the cause solves the problem, thus avoiding future effects.

The firm may perform their activities with efficiency, acting directly on the agent causing the problem (s). Thus, it is not always necessary to hire labor or investment in equipment, many times the management of same through physical arrangements, the qualification of the workforce, and, also, the preventive maintenance of machines. Avoiding downtimes that generate unnecessary costs to business.

Methodological Procedures

The technique of "content analysis" we used primary sources, reports and stories of the supervisors and managers of the company. The content analysis was applied also to secondary sources, such as books, articles, collections, dissertations and theses relevant to the theme.

It was drawn up a roadmap for each job. With regard to the technique, it was found the need for the use of the case study. Interviews were conducted in the field work with the objective of assessing the prints that the private agents, mainly the general supervisor and the managers of the establishment have about the searched subject.

In the first meeting between the researcher and the manager of the company, the main purpose was to listen to the reports and identify their needs. The data collection was carried out through interviews and oral reports for supervisors, managers and bibliographic research, taking as a basis the technical literature and academic.

All the research was directed to purchase subsidies and allow the structuring of concepts that could be applied to real situations experienced in the management of the company studied, and a better understanding of the work to be developed.

1. Theoretical Framework

1.1 - The Theory Of Constraints Or "production Bottleneck" - Toc

In the 1970s, the physical Israeli Eliyahu from Goldratt, has developed a method of administration of the production. He wrote the book *The goal* at the beginning of the 1980s, where he devoted himself to draw up more your method and to disseminate it. In this book, is criticized the method of traditional administration, where is included cost accounting, it is regarded as the number one enemy of competitiveness in the western world that, according to Corbett (1997) "he won many opponents to the Theory of constraints - TOC, but also drew great attention of those people who believed more in cost accounting as a supplier of information".

Second Goldratt apud Padoveze (1994), "what determines the strength, the strength of a chain is your weak link. The weak link restricts the best performance of the entire chain/of the whole process. Therefore, this constraint or bottleneck is that should be immediately worked. Eliminated the first restriction, other restrictions, other weak links of

the chain, will appear, and so on, a continuous improvement and strengthening of the productive process and business".

For Corbett (1997), "each element dependent on one another in some way, and the overall performance of the system depends on the joint efforts of all its elements". Every company is regarded as a system in TOC, this is a set of elements between which there is a relationship of interdependence.

The definition of key TOC refers to restriction, i.e. the factor that restricts the activities of the system as a whole. Goldratt (1997) explains that: "the first step is to recognize that the whole system was set up for a purpose; we are not our organizations without any purpose ... The restriction of a system is nothing more than we feel is expressed in these words: anything that prevents a system to achieve a higher performance in relation to its goal".

Still second Goldratt (1997), in our reality any system has very few restrictions and at the same time any system in reality has to have at least one restriction. This is explained by the fact that, if there were something that would limit the performance of the system, this would be infinity, i.e. if a company did not possess a restriction, your profit would be infinite.

In this sense (1996) says that there are five steps to put the theory into practice, and they were: identification of restrictions, i.e. the factors that restrict the system; definition of *how to exploit the system restrictions*; *subordination* of all aspects of the decisions above; *lifting* of restrictions in the system; and return to the link now weaker, *without letting the inertia becomes the new restriction*".

For Goldratt & Cox (1986) the Theory of constraints can be framed within a systemic vision business, since they are reduced the goals of an organization the question of obtaining financial results when they say that "the goal of a manufacturing company is to earn money".

The goal of a company is the profitability of the shareholder's equity", Corbett (1997). The author also says that to make the bridge between the Net Profit and Return on Investment the Theory of Constraints has three measures, where these have to be purely financial, to show that the company is going in the direction of your goal or not. In this line of thought, the whole process of business philosophy should be centered on revenue and not on expenditure and costs.

The measures of TOC, i.e. the accounting system consists of three building blocks in accordance with Goldratt (1992) which are: Gain (G); Investment (I); Operational Expenditure (THE).

Corbett (1997) argues that with these three measures (G, I, and THE) managed to find out the impact of a decision in the final results of the company. Also asks that the ideal is a decision to increase the G and decrease I and.

1.1.1 - Management Of Restrictions (gr)

Theory of constraints is a management philosophy developed by Dr. Eliyahu from M. Goldratt which can be seen as three different areas and inter-related: logistics, performance indicators, and logical thought. The logistics includes programming drum-rope-lung, the management of lungs and the analysis V-A-T. The performance indicators include gain, inventory and operating expenses, and the five steps of focusing. The tools of thought process are important for identifying the root problem (tree of current reality), for the identification and creation of solutions win-win (dispersion diagram of clouds and flying of future reality) and to develop implementation plans (tree of prerequisites and tree of transition).

The Restriction is any element or factor that prevents a system achieves a higher level of performance with respect to its goal.

The products are produced in a production system, which consists of a series of successive steps performed by different features. All the steps or operations must be completed in a specific sequence to obtain the final product. A restrictive use limits the overall output of the system.

For Slack et al (1999), "the management of restrictions is a new approach that plans and controls the production and sale of products and services. This approach recognizes the powerful role that the restriction (limiting feature) plays in determining the output of the production system as a whole. Through the knowledge and deep understanding of the MANAGEMENT OF RESTRIÇÕES (GR), managers can realize immediate improvements in the outcome of their organizations and, through a targeted approach and continuous improvement, can plan to meet the future needs ."

Second Oishi (1995), in search of high productivity and process, we must take into

account basically the considerations such as: the resources used in production; meet the desire of customers; give due consideration to workers, from a physical standpoint and moral. According to Slack et al (1999), the concept of bottleneck is important, because it is the maximum restriction on the ability of any production system. Therefore, the employee is responsible for his work during the time that you have, there are no failures that flee to their responsibility, resolving by himself the problem of lack if this is the case, so that there is continuity in normal work (OISHI, 1995).

There are some factors that influence directly or indirectly the efficiency, some physical factors:

- Speed of execution by both the employee and the means used .
- Impairments that occur during the production process for a variety of reasons such as maintenance of inefficient machines, operation in empty. Therefore, such impairments are responsibilities of the administration.
- Difference between the available manpower and necessary.
- Degree of use of the facility.

Already the human factors will depend on the causes that can be motivation through recognition of the work carried out, training, etc.

The increase of production should not be seen as consequent increase of work. There are limit ideal to be spent by man, therefore, the higher is the rate of conversion of detached work, the better will be the productive work. Since the products are generated through several sections, machines and people, therefore the yield must be analyzed and determined on a global basis. (OISHI, 1995)

1.2 - Production Administration

The administration of the production deals with the way in which the organizations produce goods and services. The objectives are to tackle tasks, problems of decisions taken by production managers who provide the services and products on which we all depend (SLACK et al 1999). The strategic objectives of the production are to understand what you are trying to achieve.

The role of the function produces the goods and services visited by consumers. However, here we use the term role of production function to designate something in addition to their responsibilities and obvious tasks of the company. We use the term to designate the basic reason why the function - the main reason for its existence, (SLACK et al 1999).

1.3 - Study Of Time In Production

The content of the study of the work refers to the procedures used for the deployment of technical improvement of situations, which directly influence the yield of human work. Understanding the study of actual activities of the workers, the physical arrangement of the premises, the working environment, the yield of the production system and the processes of transformation.

Whereas the time timed stop inactive or literally turned off, i.e. , the time in which the production is zero. By removing this time of observation period, is the Time Available, which is equivalent to a period whose production is influenced only by two types of impairments: Technical/mechanical or Organizational and/or functional (BARNES, 1977). Still the same author defines as default time the time spent by a person qualified and properly trained, working at a normal pace, to perform a task or specific operation.

This logic of reasoning steamroller and Ribeiro (2004), define the capacity of an organization as being determined by the relationship between the availability of resources and the demand for these resources, mediated by the cost-benefit ratio of production of the good (products or services). Its determination focuses on the speed of response to the market, the cost structure of the resources available for use, the composition of the labor force, the technological level, the management models and the policy of inventories.

Already the engineering methods aims design, the ways in which people or set of people running their parcels of work in a productive system.

2 - The Industry Studied

As an object of study adopted a Slaughterhouse industry Refrigerator of Cattle, large. The industry has subsidiaries and sells its products in the domestic market, and external. The company in this study is located in a city in the interior of the state of Mato Grosso. Slaughter on average approximately 650 animals per day. The company has provided data and allowed the research to the implementation of this work, but prefers to be anonymous, with the objective of evaluating the functional activities of the workers.

2.1 - Case Study

The area studied in the company is the area of slaughter, which is defined as the hot area, which is the external area of the fridge, in particular sector of slaughter, which involves the cattle from the receipt and unloading in the cowsheds through line of slaughter and derived from slaughter (kids, bucharia and triparia) until the cooling chambers.

For the proper functioning of the sector of slaughter, the company offers a framework of 106 workers to the sector of slaughter, 13 distributed in bucharia, 60 in the sector of kids and 9 activities in the corral and rail. Totaling 188 employees, with 63 classified as slaughter man is ready and 125 as helpers.

Employees specimens have a higher qualifications on the helpers. The specimens are employees that perform more than one activity on the line. Since the bleeding of beef, skinning the leather of the carcass, evisceration, sawmills, etc. Already helpers prepare certain activities to be carried out by specimens.

2.2 - Activities Of The Line Of Slaughter

The productive line of slaughter is a line contained with various activities distributed, which will include the completed activities with half carcass in the chamber for cooling. Therefore any activity that delay in line and it is necessary to stop for its implementation it is necessary to stop all other activities history and precedents. Therefore any failure for the whole productive line of slaughter and the sectors that depends on the slaughter as triparia, bucharia, and kids. As well as any of the three sectors mentioned above, case presents problems interrupts the operation of slaughter.

To better understand the impairments, was conducted a questionnaire with all activities of slaughter and not per worker. Through this questionnaire at the end of the day, it was the daily report of the amount of impairment and total time. Where each stop it was measured your time and why. Thus calculated the amount of time that the worker was available to the company discounting lunch time , impairments to the bathroom and gym.

Therefore, at the end of the day, has the critical points, and their motives, which have delayed the completion of other activities. It is important to identify these points of impairments because, through the worker who is in this activity that day, you can assess whether it is able to perform this activity, or if this activity is a critical point of impairment.

Among all of the impairments were identified the points with higher rates of impairments during the days of observation being: withdrawal of leather, displacement of the head, occlusion of the esophagus, sawdust from breast, sawing of the carcass, complimentary toiletries, track of viscera, failures of cattle in noria, SIF. AND yet, a large amount of impairments not identified. These impairments are not identified are in the course of the production line, in which the production line has 7 drive controls.

3 - Results And Discussion

3.1 - Roller

The first critical point is the withdrawal of leather mechanically "roller". Through the comments the roller problem was because the activity that the kissing, was not performed "skinning the palette and neck", so when the leather was attached to the winch roller, the same always hang or evaded, stopping the line of the whole production line. Then the solution to the tension is the use of two more specimens/silverware to perform the skinning of the palette and neck.

3.2 - Occlusion Of The Esophagus

The second step is the occlusion of the esophagus. The problem comes from the previous activity. The operation of disarticulation of the head if it is not done at the right time slows the activity later "occlusion of the esophagus" that will delay activity later "mansard heads". As a solution to this critical point of impairment would be the hiring of more an employee to work in this interval between the articulation of the head, occlusion of the esophagus and hang the head.

3.3 - Hang Your Head

After the occlusion of the esophagus, if this is delayed, will delay the activity later, to cut and hang the head. As the occlusion of the esophagus slows, and the animal is already on air rail on the track of viscera, the head will stop in the wake of viscera. Therefore, the noria has to be stopped for the removal of the head.

As a solution, the inclusion of the employee that the transcendental activities of the disarticulation of the head and occlusion of the esophagus. Thus the mansard heads only would personally behead the trachea and the esophagus and penduraria head washer head.

3.4 - Sawdust From Breast

The company counts with 2 brands of saws, the sierra and the sierra B. The sierra is a sera bad for having a blade less than the sierra B and as a result when handle animals larger than normal, (large animals above 350 kg), by having the blade shorter she saw not fully the bones of the chest, and this activity performed poorly reflected in evisceration and sawdust of housing. The sierra The is only used when the sierra B is with mechanical problems.

3.5 - Sawdust Of Housing

Usually the problems of mechanical stops sera are from the strip. The tape is usually break when the housing is poorly sawn in sawdust in his breast. The solution to the functional impairment is when comes larger animals than normal, has an employee ready to open the half-carcass and facilitate the decides of sera, thus not occur impairments.

Already track of viscera, only for mechanical reasons, problems with traction motor, belts, or by desynchronize with the production line, which can occur by it have an independent motor and drive control independent.

3.6 - Toiletries

The activities of the toiletries, aims fix the remaining failures of previous activities and give a good appearance half carcasses with the withdrawal of contusions, hematomas. Most of the impairments due to half-carcasses with many bruises that need greater attention for the withdrawal of these hematomas that.

The solution would be the placement of two (2) employees to carry out the inspection and removal of unwanted portions , with his job on the opposite side of the job.

3.7 - Failures Of Cattle

The failures of cattle on the production line are from the rail, which may take time to send animals to box of stunning, by the fact that some animals packed (stop) in rail or pour and not raise more. When the animals stop and this animal throw and not raise more is necessary to loss unconsciousness it on site and promote your bleed for after chatter this animal to the box.

3.8 - The Rail

The rail this slaughterhouse fridge is in the form of zigzag weave as if it were a "S". For this reason prevents the adaptation of a winch inside the Box of stunning because you don't have a very effective. The solution would be a rail with only one curve at maximum of 45) to avoid the scrap of cattle by facilitating the work of rail to send cattle to the slaughter, and if you

have the need to tow/chatter any animal, the winch adapted within the Box would be efficient.

Figure 1 shows the stopping points with the sum of the times timed in 6 days of data collection.

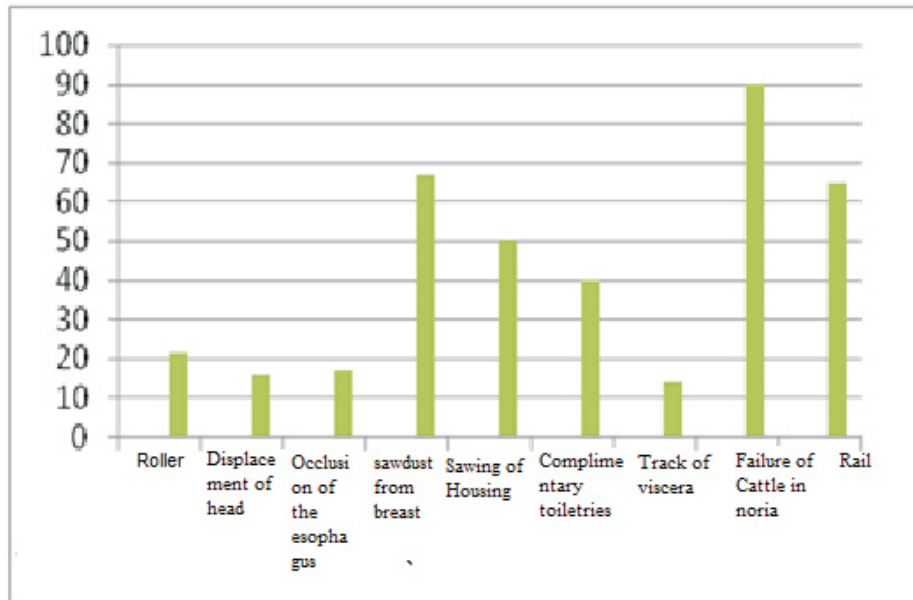


Figure 1: Main points of impairments and the time in minutes
Source: survey Data

After the study, it is easy to identify the activities that present the greatest contribution to downtime of the laborers, being these activities that deserve special attention in decision-making in order to solve the problems with impairments and can maximize the production. Attacking the main problems, in this case the activities more critical, with the five steps of TOC, and then return to the first step in order to go by eliminating the restrictions. Thus the actions taken are not erroneous due to the mapping of critical activities.

Final Considerations

The points of impairments are false bottlenecks, the activity of the roller is not well developed by the background activities were not carried out properly. Thus, as the outages occurred in the occlusion of the esophagus. The solution is the introduction of a polyvalent collaborator in this range of activities, to perform that activity that could possibly be delayed.

The sawing of breast only have functional problems with the use of The saw, the sierra B, for mechanical problems and not functional problems. The solution is to purchase more a sierra B, or preventive maintenance at shorter intervals. With the implementation of a good sawdust on the chest is unlikely that there will be problems in sawdust from housing.

The introduction of 2 new jobs in restroom aims streamline, to inspect and remove unwanted portions of half-carcass where, thus tends to reduce the impairments.

The construction of a rail with only a curve, the maximum angle is 45o solves the problem of the current.

The functional failures are easier to be eliminated through physical arrangement and qualification of employees. On the contrary, the mechanical failures may not be deducted when and where they are subject to occur, the maximum that can be done is a preventive maintenance and periodic equipment, thus ensuring a baseline performance while maintaining the quality of the products. Through the figure 1 it is possible to estimate the time at which the workers are the provision of the company without producing, and make the best of management restrictions, reducing the costs of production.

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3. Analysis V-A-T is a method of managing the constraints to determine the general flow of product components from the raw material to the finished product (GUIMARAES, 1981).

4. It derive of portuguese “Bucho” in English a place works with Stomach of animals.

5. It derive of portuguese “Tripa” in English a place works with Tripe of animals.



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