

**INCREASED PRODUCTIVITY
THROUGH AN INCENTIVE PLAN
USING A FLEXIBLE PRODUCTION
SYSTEM IN THE MANUFACTURE
OF BEDSHEETS**

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1. Abstract.

This project aims to implement of a monetary incentive program and a flexible production plant in apparel fabrics Pintex Company SA. The purpose of an incentive program is to improve business productivity and achieve cost reduction, where both the company and the worker better off.

Currently industrial changes occur quickly and steadily, the national garment industry is no stranger to this reality and the tendency is towards improving processes in all areas. Quality requirements, shorter terms of delivery, economize prices, among others, are a constant in every business, which leads to

manufacturing companies to explore initiatives that lower production costs, because in any organization especially if is within a competitive economy there is no room for waste.

In times of crisis the need to analyze the cost is vital, because the company must survive; although this should be balanced properly because it can narrow your most important asset your customers. It is important to remember that direct labor is the second most important factor in the manufacturing industry, so it is necessary to focus on efficiency, to avoid time loss obtained by a poorly implemented production system and thus make the most of its use. Often the term profit brings to our minds; higher price, higher turnover or lower cost.

2. Introduction

Any of these variables, acting together or separate may return higher profit, but overall we know that higher price margins are not handled by the company but by the market, increased invoicing is the result of an increase in sales, but instead, we can act directly to achieve lower production costs.

Profitability, productivity and quality in the manufacture of textiles, depend critically on the efficiency of the production stages. The analysis of the main production systems used in the garment industry, its characteristics, advantages, disadvantages and recommendations in choosing the best system according to the characteristics of the product, as well as optimizing the productivity and the ability to have workers motivated who effectively perform the assigned tasks. Through systematic balancing each production line, we can assure that the worker efforts are directed to achieve a common goal, a goal that has been assigned and it must be fulfilled.

2. Scope

The project was developed in the company Pintex Fabrics SA, located in the city of Quito. The company has a complete textile process, ie from spinning to manufacturing. Its scope is limited to the plant preparations, where the main product produced is cloth twine linen bed sheets.

3. Objectives

Main Objective

Increase productivity through an incentive program using a flexible production system in the process of making bed sheets

Specific Objectives

Implementing a modular production system.

Create an incentive plan for the operating personnel.

Analyze the manufacturing with the implementation of the incentive plan.

Carry out a comparison of the initial productivity with the implementation of the incentive program of the company

4. Content Development.

A set of activities that are restricted in precedence are given in the manufacture of a textile garment, Due to its discrete nature it allows the activities to be grouped in various ways within a production process. Determining the optimal lay out that minimizes the total idle time is a difficult task and involves using

techniques to reach this result, today production control has become an essential element and a competitive advantage, allowing better customer service while reducing production costs.

In Chapter 1 everything concerning quality in the area of clothing is detailed, which is defined as the set of attached characteristics or properties of a product or service that bear on its ability to satisfy an implicit or explicit need. This means that the quality of a product is equivalent to the level of satisfaction that is provided to the consumer. Additionally references to the tools for quality control are analyzed.

In Chapter 2, a study of various basic systems used in apparel production is performed by making a comparison of approaches such as the production of thrust and drag. It defines what a balancing production and lay-out of a production plant.

In Chapter 3 the methods of preparation are studied, differentiating cyclic and acyclic operations, as you separate an operation on elements and how to develop a working method. We study what a process

diagram is including the fundamental movements to save time.

In Chapter 4, the definition of standard allowed minute (SAM) is studied, to establish what is the standard, the time measurement techniques and the different elements that make up a standard time. Additionally, the learning curve is defined.

In Chapter 5 a study of the cost components in a production process is analyzed and carried out, such as direct labor, indirect labor and operating costs.

In Chapter 6 we start with the practical part of the project, the initial situation of the garment plant is analyzed, as are the initial indicators of production and the systems used until the time of study.

In Chapter 7 the implementation of modular or flexible production is done by defining the balancing of production lines and standard times for each of the operations defined in the study.

In Chapter 8 the implementation of the monetary incentive program for the production staff is done by defining downtime that will affect efficiency,

defining the way to calculate the individual, group and combined efficiency.

In Chapter 9 the costs obtained from implementing a monetary incentive program for the manufacturing staff is analyzed, analyzing cost per minute obtained in the direct labor, indirect labor and operating costs.

In Chapter 10, the manufacturing plant productivity is analyzed before and after the implementation of the monetary incentive program for the staff, analyzing the minute cost and efficiency of the plant.

At the end of the chapters considering the results it is concluded that the modular production system will allow eliminating perceptible wastes in the plant, such as: unnecessary labor, reprocessing badly finished work, among others, with the goal to work only to add value to the product. And the implementation of the monetary incentive program helped so to bring the operational minute cost down to make the company more efficient and economically viable.

5. Conclusions

An analysis of the initial situation of the manufacturing plant was made and no documented quality control indicators were found, instead an empirical control over it was. No study records the actual production capacity of the plant were found, it was empirically established for 45 units per day per person, ie, if the production line held 6 people it had to produce 270 completed units by the end of the day. Which turned out to be 10.67 minutes per set of bed sheets before implementing the production system and calculating the SAM, which later was analyzed without having an established production method and the results was an average of 50.70 units produced by operator, it is concluded that the company was losing money, the inefficiency of the plant was generating the company 11.25% less production.

By implementing the flexible production system significant reductions were obtained in the process, we were able to further maintain a constant, low level of inventories between operations and securing finished product at all times and not at the end of the day. With the SAM time study, it was determined

that the sheet set is made in 8.123 minutes, ie 31.35% higher production than what was established empirically and 16.55% higher than that obtained in the initial studies

The modular production allowed eliminating perceptible waste in the plant such as unnecessary labor, reprocessing of badly finished product, large physical spaces for the production process, among others, achieving to work with only what adds value to product.

The application of the modular system gave greater dynamism and flexibility to operators and obtaining the ability to work as a team and under pressure.

Several operators were trained in the most complex and critical operations, helping to improve the efficiency of the production line, since previously in these processes if an operator was missing for any given reason the entire plant was paralyzed or became inefficient.

By implementing a time study, productivity in the plant increased, because there is a time check for each operation and the operator has a time limit for each set to be finished.

A calculation of combined efficiency, i.e. calculation of group and individual efficiency, preventing jams or a crash in production due to faster and / or slower operators, and the operator will be affected by its performance and cooperation individually and his teamwork.

The implementation for a monetary incentive program helped lower the minute operating cost down making the company more efficient and economically viable. To calculate incentives we used a production base of 85%, i.e. on average 50.23 sets daily per line worker, which is the value that was used to pre-cost the product. It was necessary to inform the line workers about policies for incentive payments, as some operators forgot to focus on quality due to only being interested in increasing production to higher revenues, but producing low quality product is as if nothing had been produced since you have to reprocess and cost is higher. The costs of incentive pay with the increased production initially appeared that the company paid more incentives than what it was actually saving, but it should be emphasized that without the incentive system it was almost

impossible for the staff obtain quality and efficient production.

Maintaining an average of 85% efficiency the company and the operator will not obtain benefits, but if efficiency increases to 90%, the company saves USD 790.00 because of a reduced minute cost, from which it pays in incentives USD 509.00, obtaining a net savings of USD 281.00. As shown in Table 41. (Payment incentives Benefits) In addition to the savings obtained by reducing cost per minute, the company collects more revenue from the extra produced sets of bed sheets sold per month. Developing a costs reducing system helped to overcome the shortcomings in the company like:

Better use of management resources.

Recognizing costs in order to determine the prices of the products. Balancing the production line allowed all operatives to equally share the work load and reduced problems from overwork in some cases.

An important factor to successfully implement a modular production system is the communication factor; therefore, a problem solving environment so that members of the

manufacturing plant could participate was created.

6. Recommendations

Set improvements goals continually small as they may seem.

Maintain communication with all levels of the company.

Constantly monitor methods and production time limits.

In calculating incentives don't set the bar to high, since goal that the operator cannot reach or has difficulty reaching, would be detrimental to the company as it causes a negative effect, demotivation.

Consider the employees as a source of information to solve problems.

Take immediate action when detecting slow operations.

Compare current reports with previous ones to see there is improvement.

Analyze time and motion procedures whenever a new design enters production lines to establish standard times.

It is recommended analyzing the assignment of costs on a continuous and regular basis, so that the costs figure is more accurate and rational.

When a new design enters the production line, the supervisor shall conduct a time and motion study to establish standard times for each operation. The slow operations that have been detected with the study of time and motion can be expedited by placing an extra operator in each of those slow operating lines and thus the module efficiency will increase.

There are costs that are a little difficult for the company to control, such as operating costs, fixed costs and indirect labor cost, raw material, but if you can control the costs of direct labor, you will lower production costs when working with high efficiency.

The datasheet contains all information necessary for the development of key processes within the company. Therefore this information should be utilized to the maximum to serve as a basis for development of processes such as planning and scheduling.

The quality policy today must not only be linked to compliance with product standards, but should also be directed

to the proper performance of the functions.

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