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Research Article

Improvement of Production Lines in a Pharmaceutics Framework

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Abstract

Improving productivity is a key factor for all business leaders and managers. Through the optimization of production performance in a company, we have focused our work on its competitiveness and ensure its perfection in the concept of internal and external competition. The aim of this paper is to present an action to improve a production line in a pharmaceutics framework after its passage from manual mode to automatic mode. In fact, system analysis technique is used in order to study the current state of the chain in the one hand and a study of the existing of the production line is presented on the other hand.

Keywords: Production line; improvement; pharmaceutics framework

Introduction

In order to impose themselves on the market opposite customer requirements and constant competition, any pharmaceutical industry seeks to increase its productivity with the lowest cost. Indeed, the approach to improve productivity is based on a resource management method [1]. It automates its production lines, reduces malfunctions, reduces waste and eliminates delays [2]. It contributes to improving the quality of the product delivered, increasing the customer's own value and targeting the international market in order to market these products.

In a first part, we analyzed our system in a systemic way. In fact, this method makes it possible to study the raw material chain and the packaging item well, up to a finished product delivered to customers. This is how this method will analyze any technical design at any level [3-5]. In the second part of our study of the existing, we will cite the other causes which lead to these stops, as well as the weak points of the whole chain using the 5M method which allows drawing the shortcomings of each workshop by which passes the sachet product [6, 7]. In this paper we proposed to integrate a "Cartoner" machine to make the line automatic instead of manual, and using this machine we will mainly reduce the stops, increase the good quality of the products thus preventing delays in batches and avoid irregular changes to manufacturing schedules.

Study of the existing production line

Before starting a long-term improvement action in a production line, a preliminary stage is essential; it is the study of the existing of this line. This phase consists in analyzing the current state of the chain. It leads to an evaluation of functions, structures and systems. This analysis makes it possible to identify anomalies, downtime, faults and existing qualities, and according to these we establish the appropriate diagnoses and improvements.

The production stoppages that penalize productivity are twofold [8]:

A. Induced stops

These are the periods during which the means of production is stopped for external reasons: lack of supply, lack of staff, lack of energy, etc. In this category, the stops are due to a lack of organization.

B. Clean stops

These are the stops attributable to the means of production. We can carry out a more detailed analysis of the reasons for stopping by distinguishing:

a) Malfunction downtime: this is the time due to a malfunction of the means of production.

b) Exploitation downtime: this is the time due to service outages, quality issues, etc.

c) Functional downtime: this is the downtime required for manufacturing. It can be broken down into: manufacturing change time; control time; programmed tool change time; setting time; maintenance time.

To better express the variation of these stops we have applied the Pareto diagram which is a simple method to use to draw the important causes linked to these stops.

Proposal for an action to improve a production line

At the end of a detailed study, it is summarized that the lack of formed case leads to these consequences: downtime, waste, poor quality, delays in production, low productivity, etc. So we proposed to integrate a "Cartoner" machine to make the line automatic instead of manual, and using this machine we will mainly reduce the stops, increase the good quality of the products thus preventing delays in batches and avoid irregular changes to manufacturing schedules.

Before moving on to the choice of suppliers, we must draw the characteristics and description of the cartoner machine offered by each supplier. So, we will justify the use of a computer tool to simulate the dynamic behavior of the sachet line precisely the two packaging workshops [9, 10]. The methodology is not only to provide a common thread for any simulation project, but also to ensure, before the start of the project, that we have all the relevant data [11, 12].

a) Cartoner «PMM.CAM »

(Figure1) shows the automatic horizontal cartoner machine with intermittent movement PMM manufactured by the CAM group.

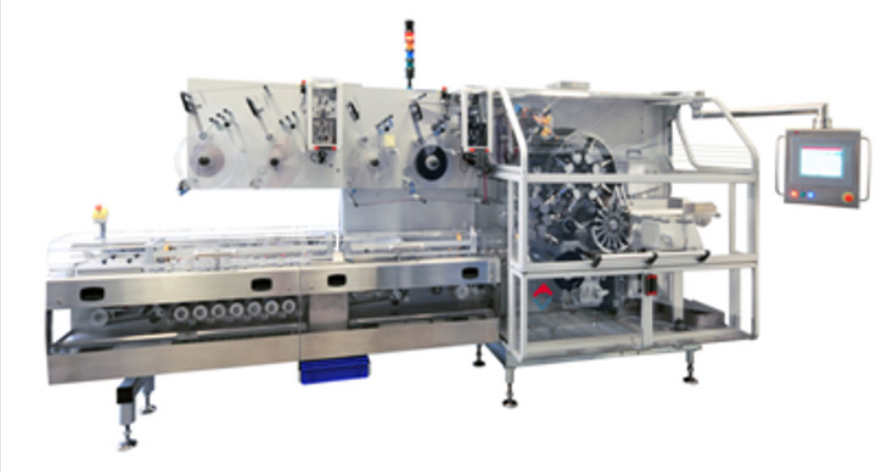
b) Cartoner « ACMA.VOLPAK »

(Figure2) shows the automatic horizontal cartoner machine with intermittent function PAK manufactured by the VOLPAK group.

c) Cartoner « FLEXA A. IMA) »

(Figure 3) shows the automatic horizontal cartoner machine with intermittent function PAK manufactured by the IMA-Industries group.

Figures 1: Horizontal cartoner machine « PMM ».



Figures 2: Horizontal cartoner machine « ACMA ».

Figures 3: Horizontal Cartoner « FIXA-A ».

Conclusion

In this paper, we engaged on a problem of automation and improvement of productivity in the pharmaceutical sector. To lead to this work, we started with the functional analysis of one of these production lines. Then, we continued our work by collecting vital data for our study of the existing in order to recognize the origins of dysfunction causing the largest losses in terms of production time. Then, in order to propose favorable solutions making it possible to uproot the sources of waste.

In addition, we carried out a study of the automated chain based on a simulation of a model very close to reality in order to identify the evolution of productivity and downtime before and after progression. By applying the 5M approach to show the defects of workshops such as packaging which have a great influence on downtime by their roles.

Starting from this study of a proposal of an action to improve a production line in the pharmaceutical sector presented in this paper, we will extend the analysis and modeling methodology to different actions in order to contribute in the improvement of hospital systems.

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