Chapter 17
Improved Laser Cutting Process in Textile–Automotive Industry

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ABSTRACT

Increase productivity is the aim of any international company. Focus on achieve their goals many of them invest their resources to survive in a global competition. Under this paradigm, the present chapter exposes the problem that one automotive organization had with a CNC laser cutting machine used in the production process of airbags. The cutting process was identified as a botleneck slowing down the rest of the production process causing problems. TO overcome this problems a continuous improvement team was assembled. The problem was model as a travelling salesman problem and improvement was achieve. The economic benefits of the solution are presented to show the effectiveness of the proposed methodology.

INTRODUCTION

In the last century and in the present one, corporations and companies have experienced great changes in their size and complexity. Nowadays, there many corporations which are large and very complex, organized in divisions which by their selves are worth billions of dollars, something that has nothing to do with the small workshops once they use to be (I.E. Hewlett-Packard). To accomplish such growth and succeed in the world with increased demand, companies decided to define different tasks and responsibilities and assign them to the different members over the company. Therefore companies evolved creating divisions, departments, areas, etc., and in this way organizations were able to obtain impressive results

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and were capable of growing without falling into chaos. However, by using this type of organization, some other problems aroused, like the competition between departments of the same company. Which such division of tasks and responsibilities, departments or areas have a certain level of autonomy and take decisions in the best interest of the department or area. Unfortunately, this could have a negative effect over other departments or areas through the organization. This happens when departments see only the picture of the trees in front of them and forget to see the whole picture of the forest. Another problem is that departments can become too specialized, and is difficult to share resources trough the different levels of the organization.

In order to help reduce this type of problems is important to see the company as a whole and face any problem in a specific area considering the effect that changes might have on other areas or levels of the company. So any research focused on a production process, should consider any effect over the different processes areas or department in the enterprise. When analyzing a company as a whole we can find many challenges and problems that require to be improved, in order to smooth the way in which the company runs. Many of these problems are faced in the production area, where goods are manufactured, and improvements have a direct impact on things like quality, cost and customer satisfaction.

Among the most important issues on the production floor are those related to process variation. Process variation problems are faced on a daily basis by organizations. Such problems many times lead to quality and customer satisfaction complaints. Any production process has an inherent variation, the issue here to keep such variation in control and at the minimum level, to warranty a smooth production process and quality of the product. If the variation on a production process is out of control, products may be defective and out of specification causing complaints from the clients. Besides the poor customer satisfaction and out of control process affects the finances of any organizations, since customers can be lost, penalty fees may have to be paid, etc. Fortunately, there are many tools from industrial engineering that can help to keep the production process variation under control and at minimum levels, by reducing the impact or eliminating the cause of such variations.

On the other hand, technology has had a significant impact on transportation industry. Nowadays, vehicles are more efficient, lighter, faster and safer. In recent years, the automotive industry has put special emphasis on cars safety as a result of customer demands and government regulations. One of the most used elements in car safety are the airbags. Airbags prevent drivers and passengers from suffering injuries in car crash accidents. Thanks to the success of the first airbags models, more complex types of them are designed and included in new cars. This has risen the demand of airbags, and the need for car manufacturers to find suppliers capable of delivering good quality airbags, in the required moment. Suppliers are required to be flexible enough to handle the different models of airbags specified for a given car model. Manufacturing an airbag requires different operations, like the cut of the raw material in different shapes that are required to produce such airbags. To ensure accuracy during the cutting process, automated equipment is used, like CNC laser cutting machines.

In this work we present the case of a cutting laser process that was not able to produce enough material for the car airbags assembly lines, causing shortages and decreasing their efficiency. Using continuous improvement routing optimization techniques, it was possible to improve efficiency of the CNC laser cutting process in 30%. In the first section of the chapter we introduce some background knowledge of topics relevant to the problem, while in the second section we shown and explain the problem. For the third section we explain the methodology to solve the problem and in the fourth and last section, we present a summary and conclusion of the work.