

# INDUSTRIAL, MANUFACTURING, & SYSTEMS ENGINEERING

## CAPSTONE PROJECT /INTERNSHIP SUMMARY



**Your Name:** Alejandra Gallegos, Marina Vazquez, Jose Dozal

**Type of Capstone (research, teaching, practical application):** Senior Design Project

**Capstone Project Title:** Non-Sterile Bulk Line Balancing

**Year and semester:** Spring, 2016



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### **INTRODUCTION**

The opportunity has come in a line-balancing project for Becton Dickinson and Company. There is a lack of a standardized process in the manual packing line, also called NSB (non-sterile bulk) area. Two different products are involved in this process, the 10.5 ml and the 26 ml ampoules assembly-packaging area. Both ampoules are filled with Chloraprep (70% Isopropyl alcohol) and are used for patient preoperative skin preparation.

Several problems in the manual packing line have been identified. Some of this issues include: there are bottlenecks on the process, the line is unbalanced, there is a lack of a standardized process, the number of employees involved in the process is undefined, the estimated number of units produced per worker is not achieved, the workstation setup is unhelpful for workers, and the employee training is not efficient.

Unfortunately limitations and restrictions do exist. The first constraint is the limitation of space: The company already established the size of the work area. Therefore, for this project we have to work within the area specified by the company. Another constraint is the health and safety. There are some materials that cannot be in the first workstation because those materials can contaminate the sterile area from the first station. Therefore those stations that work with those materials cannot be moved for regulatory reasons.

### **PROJECT OUTCOMES**

As a result of our work done the project outcomes include an equal process time for each station this way the bottleneck are avoided and the process run efficiently, we established an standardize process to reduce variation, a specific number of workers per process was implemented, as well as changes in the workstation layout. As a result of this changes we have a more efficient process, more organized and a 30% increase in productivity.

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### **INDUSTRIAL ENGINEERING PROGRAM ASSESSMENT**

It has been a great experience to be part of the Industrial, Manufacturing & Systems Engineering program. Some of the aspect that we enjoyed the most about this program is having such professional and knowledgeable Professors. They not only do their job of teaching the materials from courses but they go beyond their jobs and they encourage you to be a better student and prepare you for a professional career.

Everything that we learned in this program will help us in our life and career. Line balancing, ergonomic analysis, industrial layout design, forecasting, reliability, queue systems, process optimization, simulation, safety regulations, probability distributions, DMAIC, control charts. Also, we learned to work as a team to solve a real live problem, which prepared us future opportunities in our careers.

We will not consider changing anything in the program. It does a really good job preparing students for a professional career the way it is right now. However, We will suggest having partnership with more companies, that way future students would have more opportunities to find full-time jobs after graduation.