INDUSTRIAL, MANUFACTURING, & SYSTEMS ENGINEERING

CAPSTONE PROJECT /INTERNSHIP
SUMMARY

Your Name: Maria Arroyo, Christian Carreon, Alan Guillen

Type of Capstone (research, teaching, practical application): Practical Application

Capstone Project Title: Trash and Cardboard Disposal Process
Year and semester: Fall, 2017

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INTRODUCTION

The department of Manufacturing Engineering at Schneider Electric (West El Paso) has been struggling with a planned trash picking up system. As the team involved in the trash project we would like to offer the best solution to meet the company's needs. Our project objectives are to implement a trash and cardboard disposal route on Plant 1 at Schneider Electric. We want to increase the efficiency by creating a fluent and standardize process; we want to create a cleaner and safer environment. We based our project on the methodology of the DMAIC process for our collection of data. Once we defined the problem, collected the process times and distances. Using the information gathered we will create an analysis to design the solutions. Later, we will design a proposed schedule for the employee to follow.

PROJECT OUTCOMES

All the process is done manually, so we worked with the employees to obtain the data. We gather all the measured data to analyze all the possible solutions, including: time that takes to do a trip, trash disposal time, number of trashcans and tilt trucks, longest and shortest distance from starting point, number of tilt trucks to fill baler and cardboard bailing time, number of trash cans to fill tilt truck, number of stops, number of turns, ergonomic analysis and weights. In order to create a better access and order in the plant, we divided the layout of the plant into three different areas: Receiving and Warehouse, Switchboards, and Safety Switches. With the help of a Gantt chart, we were able to plan an estimated time of our activities. At the beginning of the project the activities from the project management are an approximation of the situation. Some of the constraints we encountered were the route approval, employee discipline, space availability, project interference, among others. The two main obstacles that we encountered was the employee discipline where no change was wanted, no cooperation and no control regulation, the other obstacle was the project interference when the warehouse was being remodeled we stayed one month without access for safety reasons.

We created a spaghetti diagram to follow the employee's current process. From the diagram we came to the conclusion that there was no route, no schedule and no control in the current process. After analyzing the data, we found out which were the main areas with the most and the less trash accumulation and the total time it takes for the filling process. We observe the lack and the abundance of trashcans in the different areas. We removed the unnecessary trashcans; from the initial 87 trashcans we left 47 trashcans. As for the tilt trucks, we reduced the number from 20 to 16, creating a savings of almost $12,000 dollars. Next time the company wants to replace the existing trashcans and tilt trucks there won't be a need to buy them. With the correct number of trash cans we apply 5S to remove the items that were no longer needed, organize them to optimize efficiency, clean the area, implement labels, create consistency and develop organization for a long term. We did a REBA (Rapid Entire Body Assessment) employee assessment worksheet to determine if the current process presented any risks of work related disorders, considering the critical tasks for the job. To find the shortest possible route we based on the TSP (Travelling Salesman Problem), we used an Excel worksheet to create the best solution with the use of an algorithm. The company has a small train that can pull 4 tilt trucks at once. Currently it is not being used. The plant manager had a task for us, he wanted the train to be in constant use. Once we had the best possible route and the working times we proposed a trash collecting route for all three areas, without passing through the same aisle twice unless necessary. We took measurements of time and distances with the use of the train. A single route used to take 57 min to complete, after the new route it took only 30

min. The distance walked was reduced from 4000ft to 467ft. As a result, we proposed the implementation of an organized schedule which includes stretches, work prep, breaks, and daily activities. Without counting the lunch breaks and the two other breaks, we put in use the schedule a single worker can do the routes 8 times a day, and still have 150 extra minutes off. The 150 minutes that we had we spread them around the schedule to make sure that the employee has enough time to do his activities properly. At the beginning of the project there was a labor productivity ratio of 32% and we increased it to 87%. In conclusion, the work of the three initial employees of picking up trash can be reduced to a single employee, therefore from $150,000 that cost the three individuals it can be reduced to $50,000 to just one.

INDUSTRIAL ENGINEERING PROGRAM ASSESSMENT

We faced certain constraints during the project. A big and important manufacturing company is constantly changing an improving its operation methods. Our project at the plant was not the only project in practice. Changes were made in the warehouse without a previous notice and our work had to be paused or we had to focus on something else. It was important to take all aspects into consideration by analyzing and thinking forward in order that the proposal for the implementation of the process can be effective in the long term. We learned to adapt in a different environment and came up with different ideas that will help us continue with the with the project regardless of the constraints we encountered throughout the project. When one idea does not work we had to apply a different one that will adjust.

It was a great opportunity to work at a manufacturing company. We got to experience a real-life problem that can be applied into a process. Our industrial partner was very considerable in our doubts and was always willing to help us. We are more than thankful with the engineers and all the employees who were there to advice. We enjoyed our senior project at Schneider Electric.