

## Abstract

Achieving overall efficiency within the manufacturing processes is the key goal among many organizations. Reducing waste enables manufactures to save money and take production up a notch. LEAN manufacturing and DMAIC are tools that can be helpful to reduce costs by removing waste within an organization, increasing productivity, and addressing environmental impacts. In search of improving the manufacturing PV, opportunities for improvement were identified in the weighing & dispensing process that would bring multiple benefits. Nowadays, companies' principal goals are focused on costs, waste reduction and reduce production time. By implementing dedicated containers for a specific process manufacturing area has been able to reduce generated waste, reduce yearly costs and improve cycle time of processes. Because less is more.

**Key terms** – cost reduction, lean Six Sigma, waste reduction, continuous improvement, DMAIC, capacity

## Introduction

Johnson & Johnson Consumer Healthcare Solid Dosage Manufacturing Puerto Rico Site, produces pain fever relief products. Due to the current global situation, product demand increased, driving a volume increase at the site. The Direct Compression Area was identified as a potential multiproduct growth for the company this year. Volume increase and area productivity are company's goals for the mentioned area. So, during an evaluation was identified that the Weighing and Dispensing processes of product "A" had some opportunities for improvements. Which would lead to meet the expectations, resulting in cycle time improvement, waste, and cost reduction. All this by just making a change in the designated container for the storing of the pre-weighed components per lot.

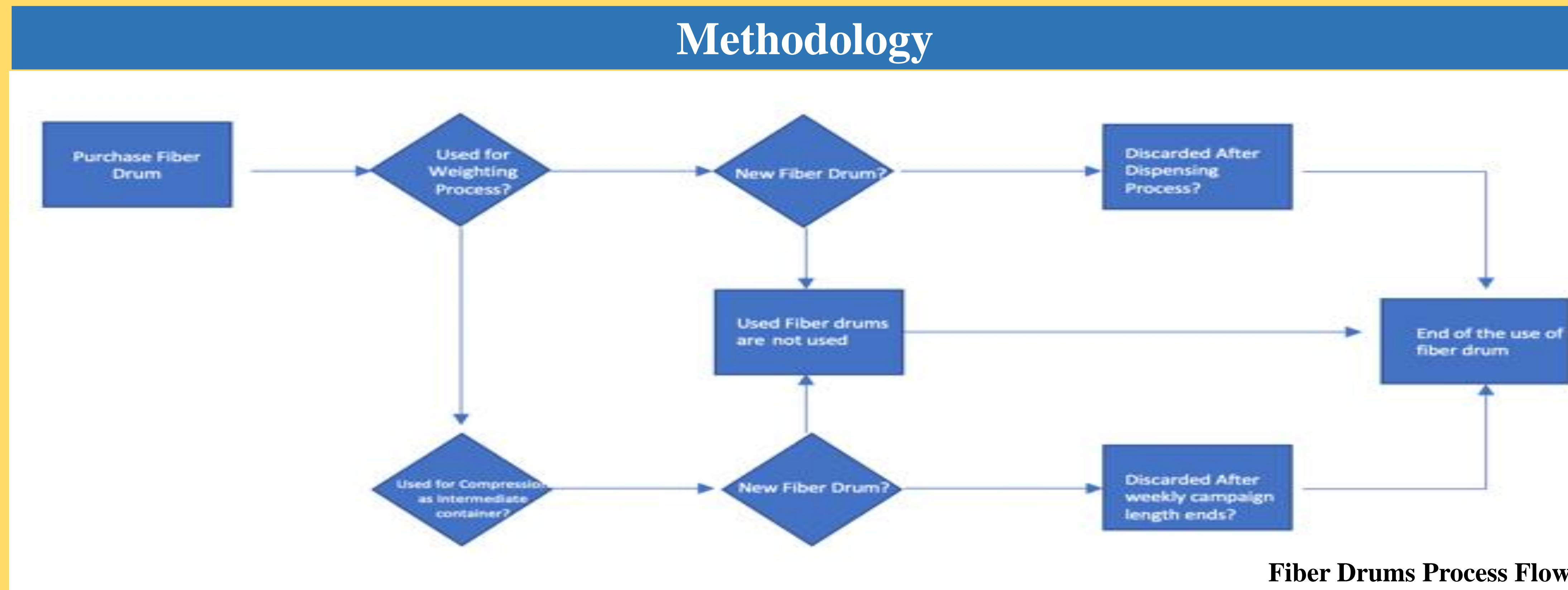
## Background

During the current weighing & dispensing process of product "A" in Direct Compression manufacturing area, four raw materials are weighted using fiber drums for each component 1, 2, 3 and 4 (raw materials) by lot. These drums are used once during the whole process and doesn't get damaged because the Standard Procedures specify that a plastic bag should be use (put) in the drum before starting the weighting process (transfer of raw material to the fiber drums). Each one of the drums are completely new before each use and these are discarded after the dispensing process is completed. A total of 7 drums are used per lot with an estimate of 268 lots per year are manufactured from Direct Compression area and the cost per fiber drum is \$25.19/ea.

## Problem

Discarding fiber drums behavior results in waste generation, environment problem and a lot of expenses in purchases per each processed lot.

## Methodology



Fiber Drums Process Flow

Component	Raw Material (kg)	Required Fiber drums (19 gal)
1	2.34	1
2	18.9	1
3	39.1	1
4	35.8 (two portions)	2 per portion = 4 drums

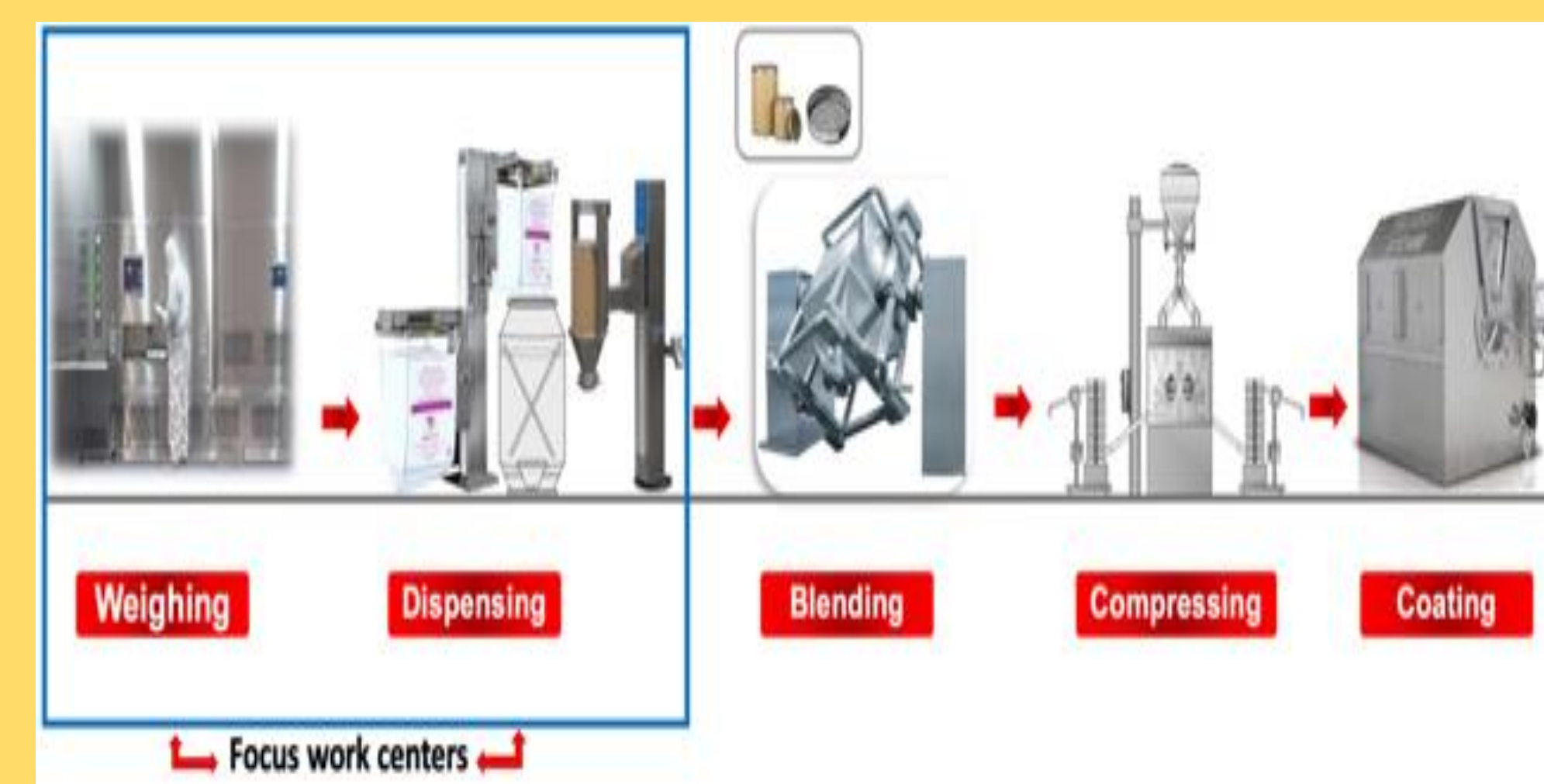
Fiber Drum Usage

	Setup	Dispensing, Delumping, Charging, Dispensing				Closeout & Minor C/O
		Component 1	Component 2	Component 3	Component 4	
Previous Time	0:15	0:15	0:15	0:20	0:24	0:20
Actual Time	0:15	0:15	0:15	0:20	0:12	0:20
	0:15	1:15			0:20	
Actual Total Time	1.37 hr:mm					
Previous Total Time	1.5 hr:mm					

Dispensing Phase – Flow Diagram

Component	Plastic Drum required	Drum gal
1	1	15
2	1	15
3	1	30
4	2	40

Plastic Drum Usage



Product "A" Process Flow

## Results and Discussion

### Containers Optimization for Component 4

For this project I ran a time study during Dispensing phase to evaluate and determine the actual time of execution of this activity. Also, simulated the results with the containers improvements for Component 4 resulting in an optimization of 12 min from 24 min (half the actual time); considering that this phase consists of multiples steps as: Setup, Dispensing, Delumping, Charging, Dispensing and Closeout. Previous weighted components are charged to the designated bin using a drum lifter and a quick sieve taking an estimate of 1.5 hr per lot. Component 1 takes 15 min, Component 2 takes 20 min, Component 3 takes 30 min and Component 4 takes 24 min.

### Waste Reduction

There are 268 lots that can be manufactured by year. If we traduce that total in quantity of fiber drums used per year is equivalent to 1,876 drums (7 drums per lot). That's why optimizing the use of drums for component 4 was also an important objective of this project not only the change of the material itself. Reducing to 2 drums for 4 for Component 4 per lot. With these improvements of containers, we will be capable of reducing a total of 13,132 pounds of waste that ended up in the dump.

### Cost Reduction

Every company wants or seek of doing more with less. So, projects for improvements, cycle time reduction, waste reduction and cost reduction are always performed on the daily basics. Beginning with the cost of each fiber drum at \$25.19 ea. It means that the project was capable of create a saving wave of 47K approximately.

## Conclusions

The numbers of waste reduction, the time saving, and the cost reduction demonstrate an increasing potential for the company and the manufacturing area that keeps growing and growing. Opening new points of opportunities in the process. Initial week of implementation includes the impact of the learning curve since people are handling with more precautions the new containers and are learning the equipment (drum lifter & quick sieve) behavior.

Some remarks to highlight, and as a recognition for a great effort during the project execution, are directed to the experts that were key during the design of the solution and in the implementation helping the team with the cleaning process evaluation for the new containers, environmental potential, equipment capacity evaluation, SOP revision, training and hypercare strategy. Also, the technical team was committed to the project from the beginning to the end ensuring the proper implementation and within the time goal defined.

Since the principal goal was achieved with extraordinary results, we look forward to evaluating the Direct Compression area minimum quantity of plastics containers to ensure maintain a healthy Kan Ban lots between shifts and during weekends. Also, is important to keep looking for this type of change in the other manufacturing areas where fiber drums are also consumed during their processes and throw it out with just one use.

Collaboration from the project team and process monitoring are required to ensure that the containers are handled correctly and that there's no issues with the equipment's. Area Performance PV will be the key to monitor and ensure that the time saving in Charging system is giving the expected results. Also, finance department report for the next quarter will reflect the cost and waste saving generated from this initiative.

**Estimated savings (\$) per year:**  
 7 fiber drums x 268 lots a year = 1,876 drums  
 1,876 drums x \$25.19 = \$47,256.44 per year

## References

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