Evaluation to Sleeves Used in Granulation Department

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ABSTRACT

The DMAIC methodology was applied to analyze a manufacturing system at Johnson & Johnson Pharmaceuticals in Las Piedras, Puerto Rico. The methodology was used to improve the time for changing and washing the sleeves of different machines in the area. Time variables were taken into consideration and based on the results of their analysis, the solution to the problem was identified. In this way, time was minimized, and savings achieved in the company.

INTRODUCTION

The DMAIC methodology can be used in different areas and systems, such as: automobile production systems, Production in medical devices, drug production, among others. In the granulation area of the McNeil, Las Piedras facility, specifically in equipment such as the Charging System, Quick Sieve and the Vertical Granulator VG-2000, reusable bone fabric sleeves are used after their major cleaning, during the evaluation. This process becomes very complex because of having to transport the sleeves to roto granulator area washing machines are located

BACKGROUND

- **Define phase**: is used to describe and define the place where the data was collected; and problem definition
- **Measure phase**: the behavior of the collected variables is identified.
- **Analysis phase:** the probable causes of the problem will be identified and given priority.
- **Improve phase**: possible solutions to the problem are exposed, it is important to be creative and innovative.
- **Control phase**: the new system model must be presented, considering the actions that must be established so that the recommended improvements can be made. The continuous monitoring is implemented.

PROBLEM

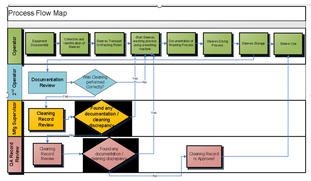
.Minimize changeover time

.Reduce costs

.Increase production output

.Relocation of washing machines

.Agile in the cleaning process



METHODOLOGY

DEFINE PHASE

Title: SIPOC

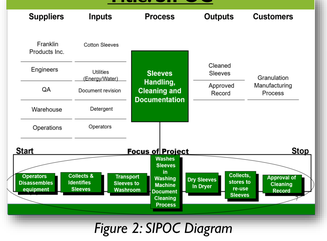


Figure 2: SIPOC Diagram

Title: Sleeve

Figure 3: Sleeve

Title: VOC

To identify critical metrics for process performance

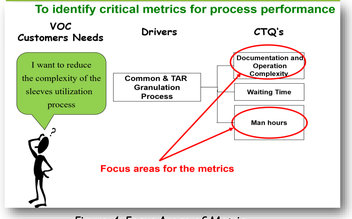


Figure 4: Focus Areas of Metric

MEASURE PHASE

Title: Control Diagram

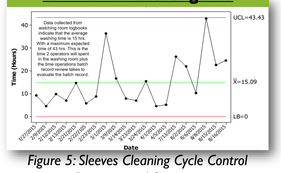


Figure 5: Sleeves Cleaning Cycle Control Diagram and Statistics

Title: Spaghetti Diagram 1

First Floor from Granulation Area to Rotor Area
Total steps 232

Figure 6: Sleeves Transportation Spaghetti Diagram 1

Title: Spaghetti Diagram 2

Spaghetti Diagram 2: First Floor Granulation Area
80 Steps

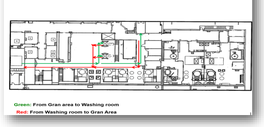


Figure 7: Sleeves Transportation Spaghetti Diagram 2

ANALYSIS PHASE

Title: Ishikawa Diagram

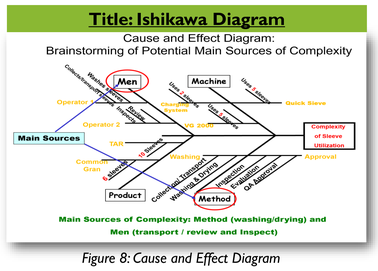


Figure 8: Cause and Effect Diagram

Title: Prioritization Matrix

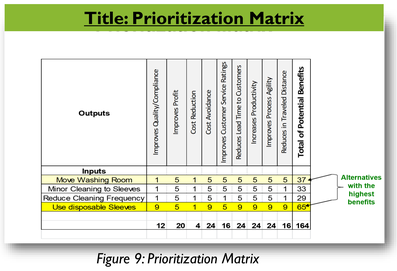


Figure 9: Prioritization Matrix

IMPROVE PHASE

Title: Flow Diagram

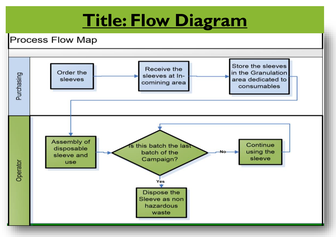


Figure 10: New Process Flow Diagram

Title: Reusable Sleeve

Figure 11: Reusable Sleeve

CHANGES

Total time saved is 15.09 hours

Title: Disposable Sleeve

Figure 12: Disposable Sleeve

CONTROL PHASE

Title: New Activities

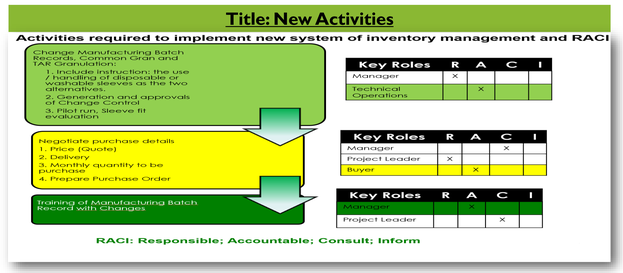


Figure 13: Activities Requierd to implement new system

RESULTS AND DISCUTION

Table 1: Summary Results

Change	Before	After
Sleeves were changed from re-usable to disposable.	Granulation area sleeves were washed and dried after the campaign is completed to be re-used	Granulation area sleeves will be disposed after the campaign is completed
Sleeves Transportation was eliminated	After use, sleeves are transported from the Granulation area to the washing room 365 steps are required. After cleaning, sleeves are transported back to the Granulation area	Sleeves are disposed, no transportation to washing room is required
Cleaning Record generation is eliminated	During the cleaning process, 2 operators generate a record as part of the cleaning requirements	Since sleeves are disposed no cleaning documentation is required
Cleaning Record is reviewed by Operations and QA is eliminated	Operations personnel and batch record review review/revise the cleaning records for approval	Since sleeves are disposed no cleaning documentation is required

CONCLUSION

Table 2: Before and After Cost

Monetary Areas	Cost Before Changes	Saving	Cost After Changes
Electrical Energy	$58,700.00	$10,600.00	$48,100.00
Water	$20,000.00	$8,556.00	$11,444.00
Carryout	$11,700.00	$11,700.00	$0
Detergent	$537.00	$537.00	$0
Total	$90,000.00	$31,393.00	$59,544.00

FUTURE WORK

In order to carry out the continuity of this project, it could be taken as a second phase, moving the washing machines to an area closer to the machinery. In this way it would serve as a backup plan, in this way you will not have the worry of reducing production

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