

# Process Improvement in a Manufacturing Line

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## Abstract

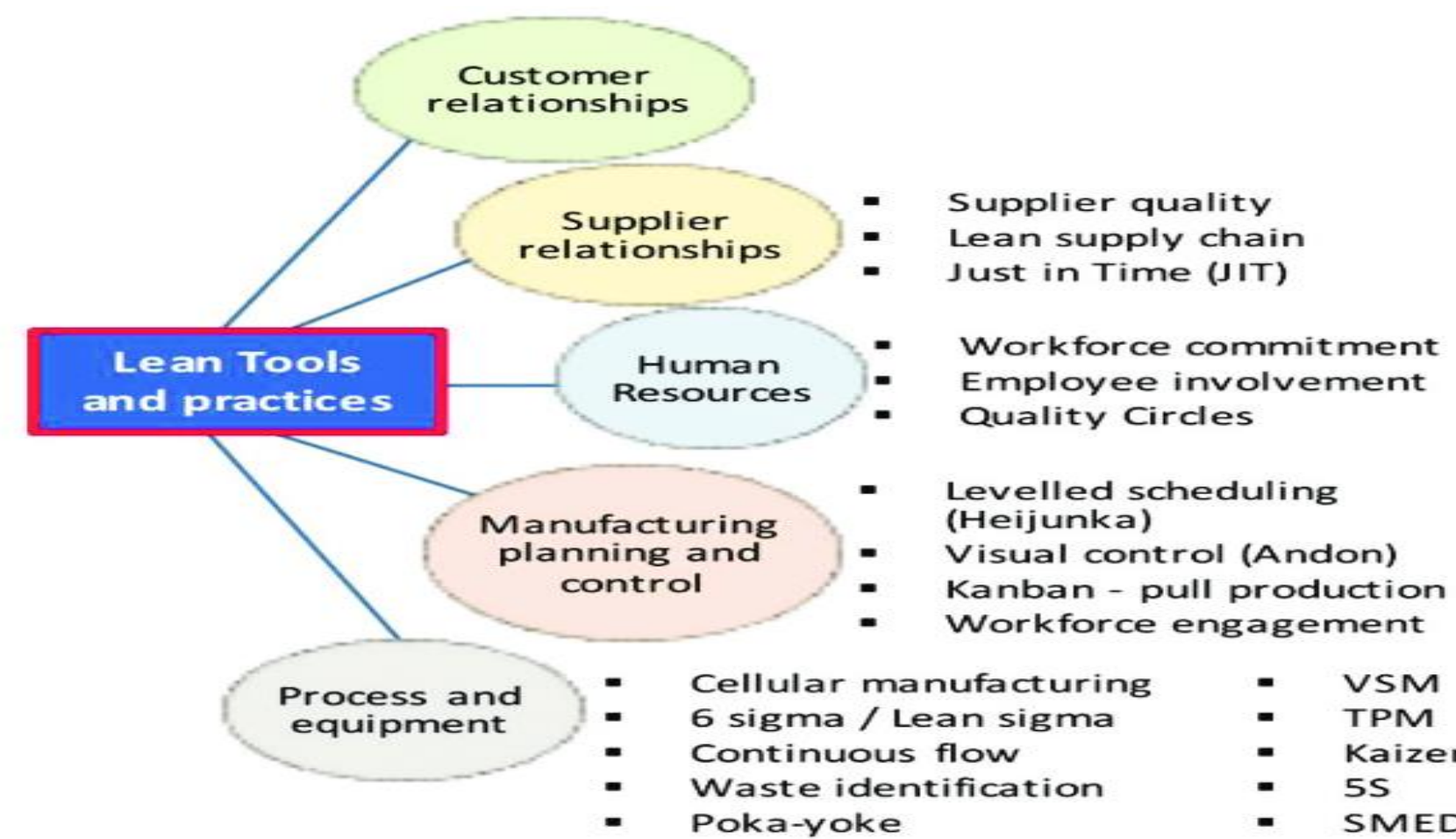
This project was carried out through the implementation of the DMAIC methodology in conjunction with the 6S methodology, seeking as a result to increase efficiency in a production line. This project is part of the strategy of continuous improvement in the company, which seeks the reduction of waste, manufacturing time, inventory, costs, etc. The results were analyzed using the TIMWOOD tool, the spaghetti diagrams and graphs to identify and classify the wastes. Finally, the implementation of strategic recommendations for process improvement, control and monitoring methods for the changes made was carried out. As a result of the project, there was an increase in efficiency, a reduction of the WIP as well as a reduction in the footprint of the manufacturing area and the transportation of materials thus achieving the established objectives.

## Introduction

At present, the companies are constantly looking for alternatives to improve their processes every day. The Stryker's continuous improvement department objective is to constantly search and identify areas of opportunity within the different processes that are carried out in order to make them more efficient and effective, thus reducing production costs by giving the company a competitive advantage.

## Background

Nowadays, efficiency and competitiveness are crucial for the success of any company, so applying the Lean Manufacturing philosophy becomes the key that allows us to successfully manage the challenges related to costs, quality and delivery times in conjunction with a series of integral principles, methods and tools. As part of the continuous improvement of Stryker P.R. by 2018, the goal was to identify areas for improvements in the processes of the different manufacturing units of the plant. The manufacturing unit of Sports Medicine which has the particularity that in recent years had received the introduction of several new products, but after the launch of the different products an analysis of the efficiency of production processes had not been made. The objective of carrying out this analysis is to identify and implement improvements that help increase efficiencies and reduce production costs while maintaining quality and safety standards.



## Problem

The objective of the research is to use the DMAIC and 6S methodologies in a period no longer 7 days to achieve an increase of at least 10% in the efficiency of the manufacturing process for the product Cinchlock and at the same time to ensure compliance with the conditions of order, hygiene and safety, as well as an optimal distribution of available space.

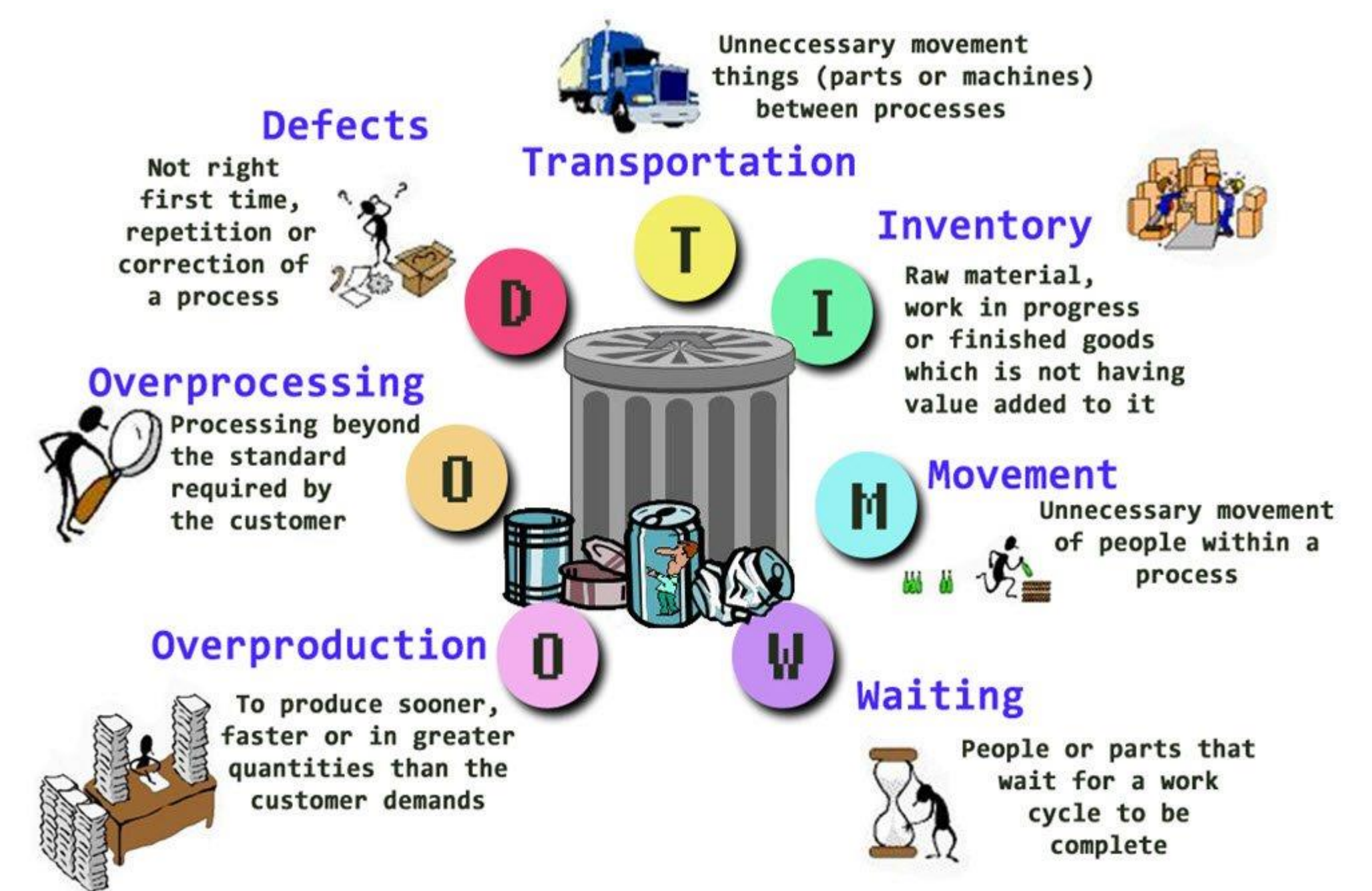


## Methodology

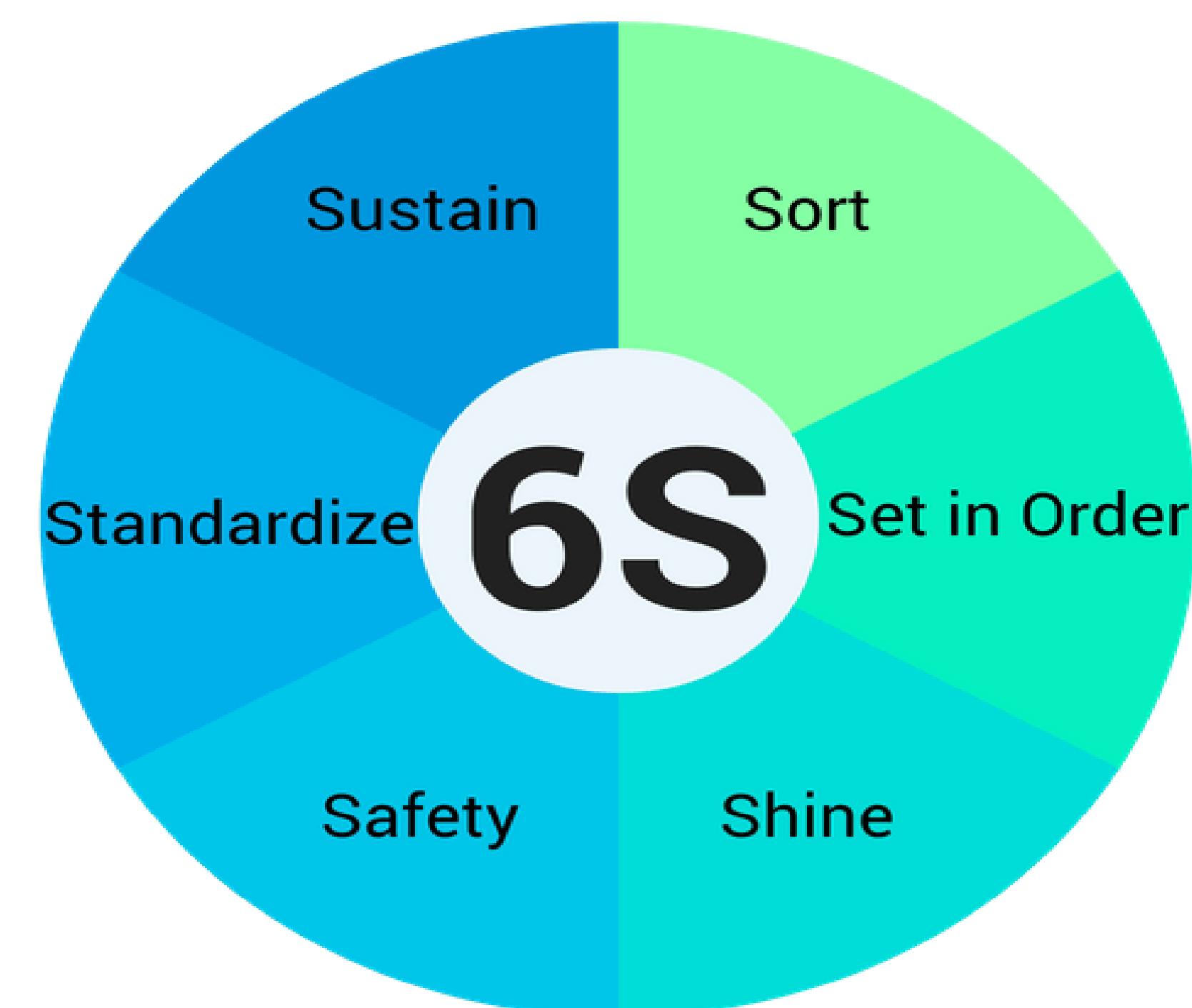
The DMAIC is a structured methodology for solving problems. The letters are an acronym for the 5 phases of the improvement of six sigma.



The philosophy of manufacturing Lean classifies waste production in the following 7 categories which we can remember by its acronym TIMWOOD.

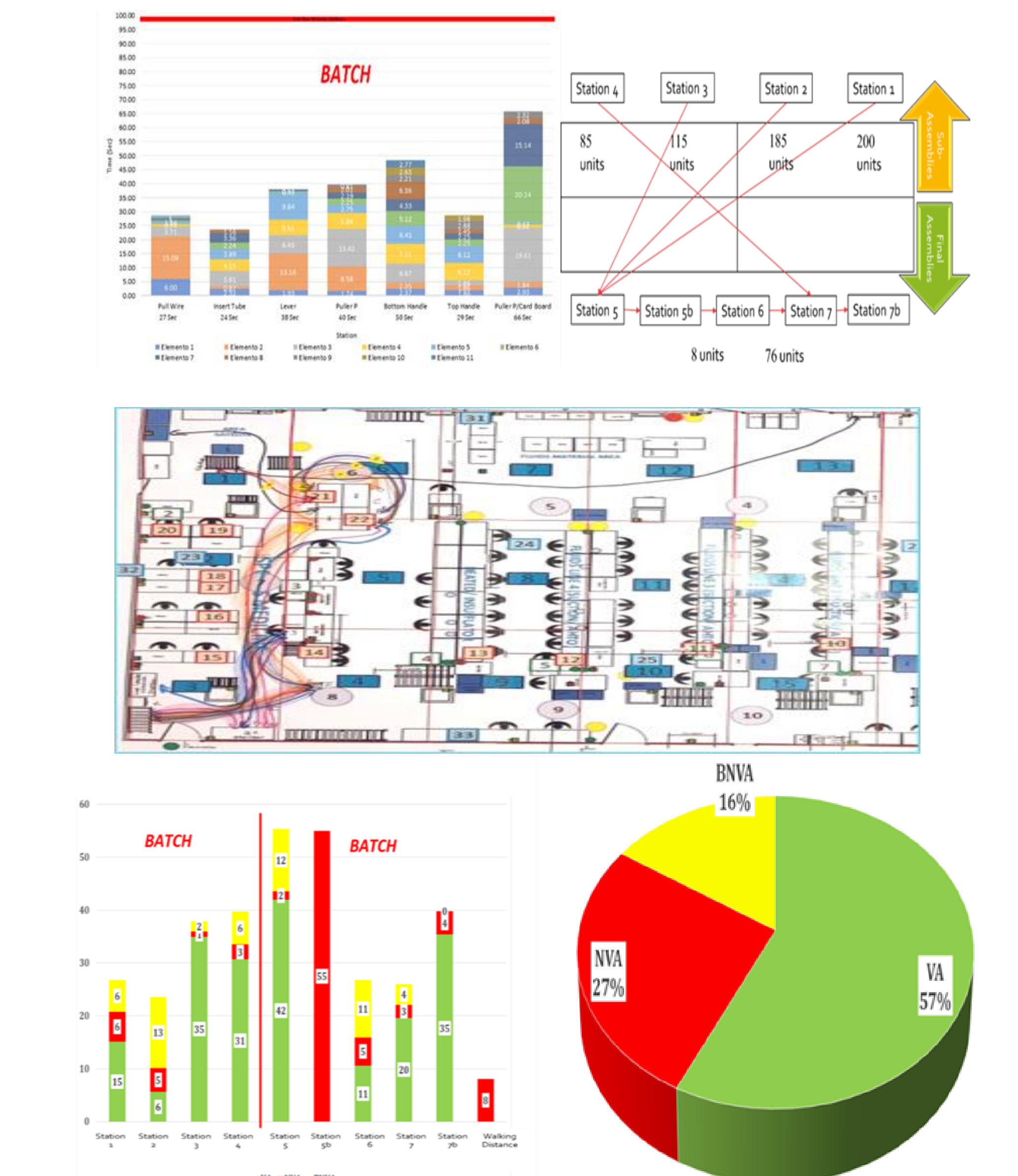


The 6S methodology is a system that aims to promote and sustain a high level of productivity and safety throughout a workspace. 6S not only helps organizations promote efficient working environments but also establishes a sustainable culture of safety.

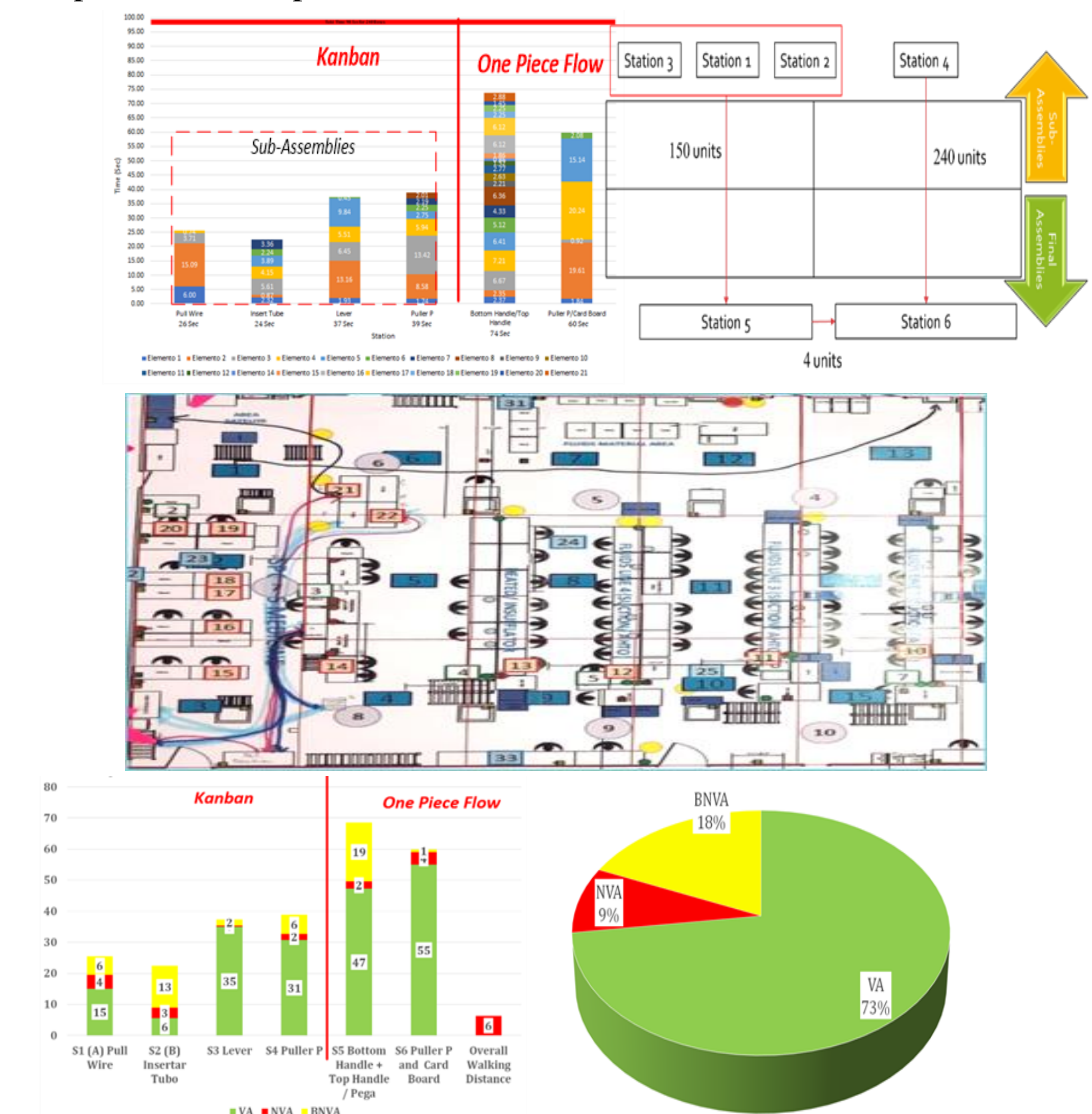


## Results and Discussion

Measurements of the process in the current state were taken to identify the areas of improvement. Among the tools and metrics used are Takt Time, TIMWOOD and Spaghetti Diagrams.



After completing the measurements of the key aspects of the manufacturing process, the tasks of the different stations were taken and divided into their different elements. The division of the elements helped us identify which elements add value to the product and which do not add value to it. After the improvements were implemented, the measurements were repeated again to evaluate the effectiveness of the improvements implemented.



## Conclusions

The project objectives were completed satisfactorily. An increase in efficiency of 15% was achieved. In addition the WIP was reduced by 95% which represents an estimated saving of \$ 11,000. Other satisfactory results obtained by the implementation of this project were the reduction of the activities that do not add value to the manufacturing process by 16%, The use of space in the manufacturing area was reduced by 12.5%, which provides additional space for the manufacture of other products and reduced the distance in which materials are transported by 40%.



## Future Work

It was recommended to install a rail on the manufacturing tables to maintain the efficiency of the process and the flow of material between stations and to evaluate the custom pneumatic press design to improve its performance and efficiency. Also new manufacturing processes will be evaluated to improve their efficiency.

## Acknowledgements

- Stryker Manufacturing and Continuous Improvement Departments' Teams
- Prof. Carlos Gonzalez Miranda, PhD

## References

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