



Abstract

The 5S is a Lean methodology widely used for companies to address their workplace organization and cleanliness. For this project, it was applied at Linde, Puerto Rico. Employee and equipment downtime increased due to poor inventory organization and management. Therefore, the 5S were performed for the areas that needed urgent organization. Employee downtime was reduced from 10% to 4% average downtime and a benefit of \$1,500 was acquired. Long-term benefits are expected to keep reducing employee downtime and to maintain a culture of cleanliness in the workplace environment. Standards were placed to promote continuous improvement and broken windows theory to sustain company efforts.

Introduction

Linde is a company that produces industrial gases, in Puerto Rico production is focused on nitrogen, oxygen and argon. Recently, the plant has overgone internal assessments and audits that have indicated that many areas of the plant are cluttered with spare parts and equipment that have not been identified, organized, or monitored. Disorder in the warehouses have been reported that has impacted employee downtime since when looking for a particular item employees took too much time trying to identify it and even in some cases the item wasn't found which in some cases can incur in significant losses for the company.

Objective

To optimize operational efficiency and workplace safety at Linde, Puerto Rico. For this, the 5S methodology was systematically implemented to reduce waste, enhance productivity, and provide a cleaner working environment.

Background

5S is a Japanese system designed to reduce waste and optimize productivity by maintaining an orderly workplace [1]. The five principles of 5S are:

- Seiri (Sort): Identify and remove unnecessary items to reduce clutter, promoting safer, more spacious areas [2].
- Seiton (Set in Order): Organize remaining items for easy access, with important items strategically placed and an inventory maintained [3].
- Seiso (Shine): Keep the workspace clean and fix any broken equipment to prevent small messes from growing [4].
- Seiketsu (Standardize): Create guidelines and schedules to maintain the first three steps [5].
- Shitsuke (Sustain): Develop a culture of continuous improvement. Broken Windows Theory to eliminate disorder instantly to prevent people to disorder[6].

Methodology

Sort:

- Categorized equipment into necessary, unnecessary, and needing repairs.
- Disposed of unnecessary items and recycled materials like paper, wood, and metals.

Set in Order:

- Organized equipment left from sort in clean spaces.
- Created an inventory record and restricted warehouse access to authorized personnel.

Shine:

- Cleaned the warehouse and equipment according to company standards.

Standardize:

- Developed standards for inventory control, equipment organization, and workplace cleanliness.

Sustain:

- Enforced all previous phases and introduced the Broken Windows Theory.

Results and Discussion

Employee Downtime Data:

- Initial average downtime: 10 minutes per employee. Figure 1.
- After 5S implementation: reduced to 4 minutes per employee. Figure 2.

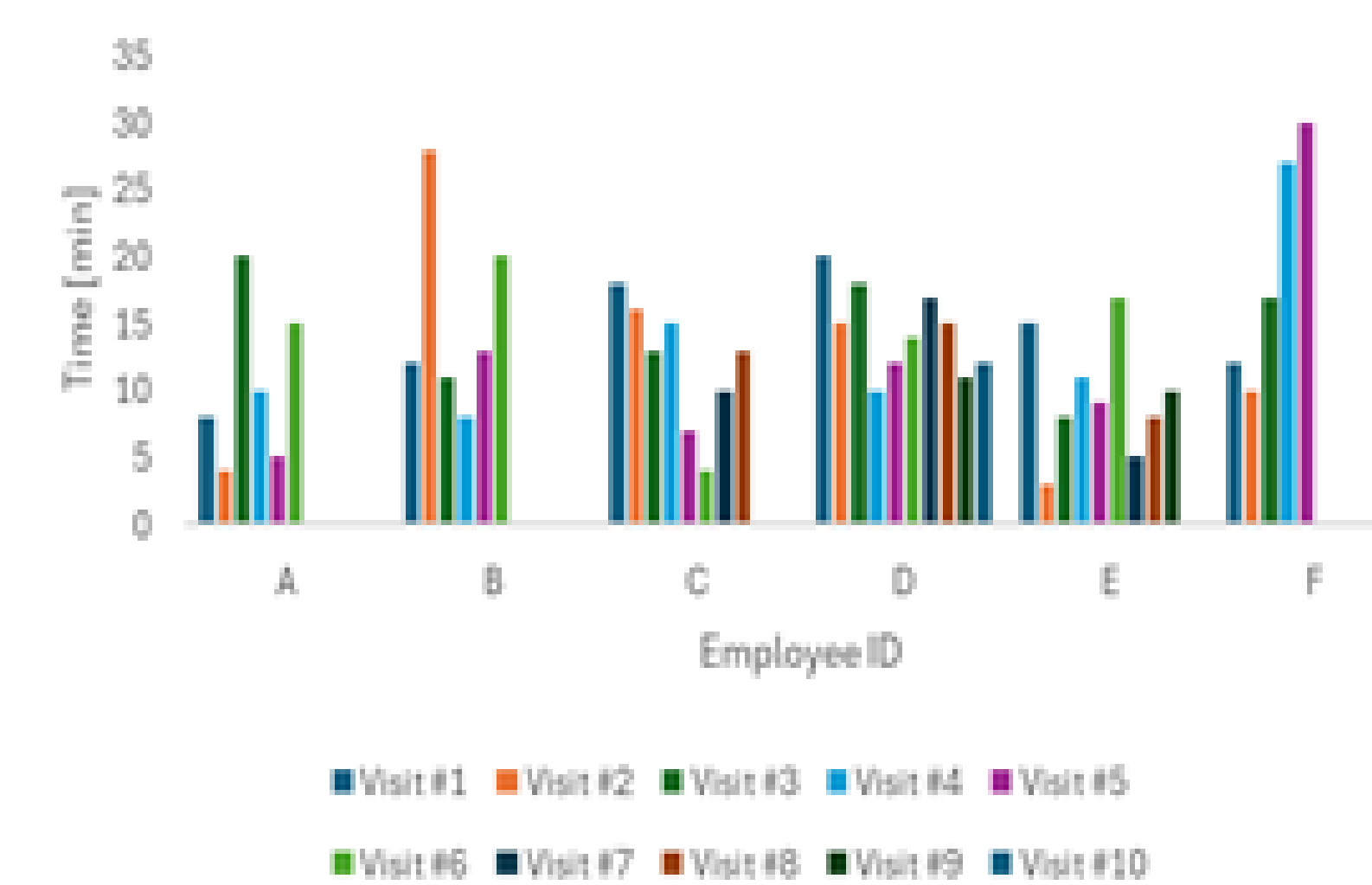


Figure 1
Employee Downtime

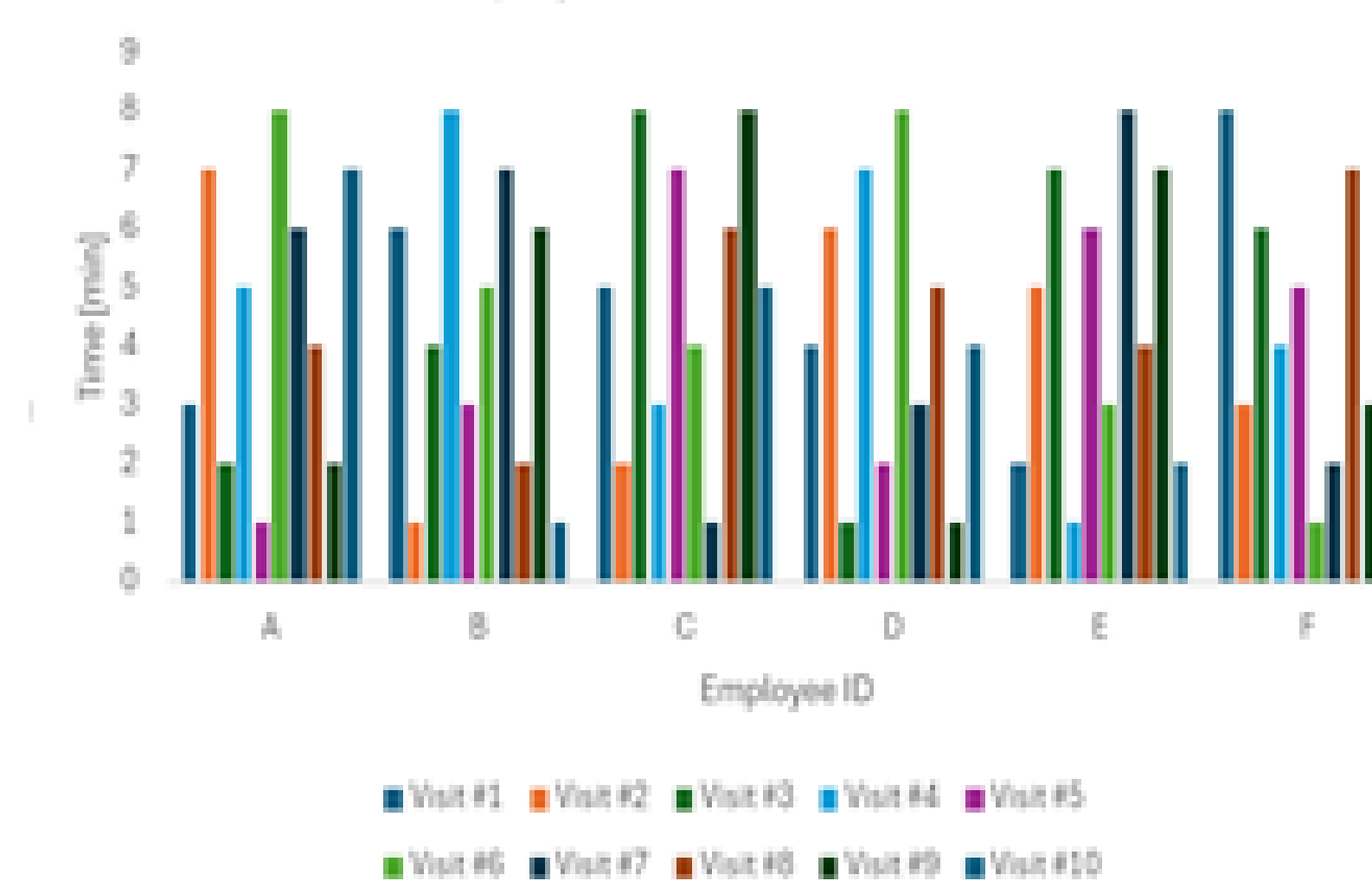


Figure 2
Employee Corrected Downtime

Financial Impact:

- Sold scrap metals for \$1,500.
- Found previous repaired parts for approximately \$50,000.

Operational Impact:

- Created an inventory control system.
- Established a culture of organization and cleanliness.

Conclusions

The implementation of the 5S methodology must be a standard for all companies in which they create and promote a culture of continuous improvement and workplace cleanliness. By providing clean and pleasant environments people are more efficient and more motivated to perform. In addition, it is a low-cost project that has major long-term benefits for the organization. It also has the opportunity to gain some capital by selling materials that are unnecessary for operations but maybe usable for other people. The project effectively reduced employee downtime while looking for equipment at the warehouses, inventory was created and can be controlled, and culture of organization was built up. Also, the broken windows theory will help maintain the culture expected in the workplace.

References

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