Implementation of 5s (Sorting) At Steelmax Rolling Mills Pvt Ltd. Kanjikode, Palakkad

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Abstract- *This project aims to restart the implementation of the 5S methodology at Steelmax to enhance workplace organization, efficiency, and safety. By revisiting the 5S model Sort, Set in Order, Shine, Standardize, and Sustain we will address previous challenges and engage stakeholders comprehensively. Data will be collected through surveys, interviews, observations, and document analysis, and analyzed using descriptive statistics, thematic analysis, and trend analysis. The project seeks to create a more productive, organized, and safe work environment, fostering a culture of continuous improvement and operational excellence.*

Keywords- 5S methodology, workplace organization, efficiency, safety, continuous improvement, data analysis, employee engagement.

I. INTRODUCTION

The 5S methodology in lean manufacturing Sorting, Setting in Order, Shining, Standardizing, and Sustaining enhances workplace organization and efficiency. It eliminates clutter, reduces waste, and improves safety by ensuring only essential items are accessible and maintained. This structured approach fosters a culture of continuous improvement, boosting operational performance and employee satisfaction.
Steel manufacturing companies in India are key players in the global steel industry, producing a wide range of steel products for various sectors, including construction, automotive, and infrastructure. Major firms like Tata Steel, JSW Steel, and Steel Authority of India Limited (SAIL) drive the industry, leveraging advanced technologies and large-scale production capabilities. The sector contributes significantly to India's economy and employment, with ongoing investments in innovation and sustainability.

STEELMAX, an ISO 9001-2015 company, is a leading TMX steel bars manufacturer with a facility in Kanjikode, Kerala. Despite its relatively recent inception, it has become a strong brand known for steady growth and high-quality products using advanced global technology. Incorporated on February 17, 2004, Steel Max Rolling Mills Limited is a non-government public unlisted company with an authorized capital of Rs 500 lakhs and a paid-up capital of Rs 480.6 lakhs. The company, active in the metals manufacturing sector for 18 years, last held its AGM on September 30, 2017, and updated its financials on March 31, 2017. Current directors include Mangattil Moosa Kutty, Parayil Moideenkutty, and others.

II. REVIEW OF LITERATURE:

"A design thinking approach: Applying 5S methodology effectively in an industrial work environment." Muotka.S, Togiani A, Juha Varis. -2023.

Applying Design Thinking to 5S implementation resulted in an impressive 80% reduction in floor space for hoisting motor buffer storage and a substantial decrease in waste from unnecessary transport activities. This underscores the effectiveness of user-centric approaches in streamlining operations and boosting productivity. To further enhance outcomes, deeper user research and ongoing collaboration with frontline workers are recommended. Overall, integrating Design Thinking into 5S implementation drives tangible improvements in efficiency and safety, offering a competitive edge in business.

"Assessment of the 5S Approach Strategy for Small Medium Enterprise (SME)." T. Vincent-2020.

The 5S approach implemented at Fatt Choi SdnBhd Company's packaging section led to improved efficiency and waste reduction. Pre-implementation issues were addressed through the five stages of 5S, resulting in significant improvements in worker understanding and acceptance of the system. Continuous training could further sustain these gains, highlighting the benefits of 5S in SMEs for enhanced workplace satisfaction and efficiency.

III. OBJECTIVES

PRIMARY OBJECTIVE:

- Implementation of 5s model (Sorting) at STEELMAX ROLLING MILLD Ltd, Kanjikode, Palakkad.

SECONDARY OBJECTIVES:

- Identify all items, tools, equipment, and materials in the work area.
- Determine which items are necessary, which are unnecessary or rarely used.
- Create sorting guidelines and procedures.

IV. RESEARCH METHODOLOGY

The descriptive research design involves observing and collecting data on a given topic without attempting to infer cause-and-effect relationships. The goal of descriptive research is to provide a comprehensive and accurate picture of the population or phenomenon being studied and to describe the relationships, patterns, and trends that exist within the data.

The research design objective for restarting the 5S implementation at Steelmax is to assess and improve workplace organization, efficiency, and employee engagement. This involves evaluating the current state, learning from past efforts, gathering stakeholder feedback, and setting clear metrics. The project will include ongoing monitoring and developing strategies for sustaining improvements to create a more efficient and organized work environment.

V. DATA ANALYSIS

SEGREGATION OF MACHINES BASED ON THEIR USAGE

Machine	Daily Usage (hours)	Monthly Usage (hours)	Necessary / Rarely Used
Re-Heating Furnace	10.66	319.8	Necessary
Roughing Mill (3 Stands)	10.66	319.8	Necessary
Intermediate Mill (4 Stands)	10.66	319.8	Necessary
Quenching Box	10.66	319.8	Necessary
Pinch Roller	21.32 (2x per cycle)	639.6	Necessary
Rotary Shear	10.66	319.8	Necessary
Cooling Bed	10.66	319.8	Necessary
Mechanical & Chemical Testing	122.87 (approx.)	3686	Necessary
Cold Shear	10.66	319.8	Necessary
Bending and stacking	184.3 (approx.)	5529	Necessary
Dispatch	0.74 (approx.)	22.12	Necessary
Additional Rotary Shear	Varies	Varies	Rarely Used
Additional Pinch Rollers	Varies	Varies	Rarely Used

CALCULATION

Total Combined Monthly Hours:

- Sum of all "Monthly Usage (hours)" from the previoustable.
  319.8+319.8+319.8+319.8+639.6+319.8+319.8+3686+319.8+5529+22.12319.8+319.8+319.8+319.8+639.6+319.8+319.8+3686+319.8+5529+22.12
  =10616.52 hours

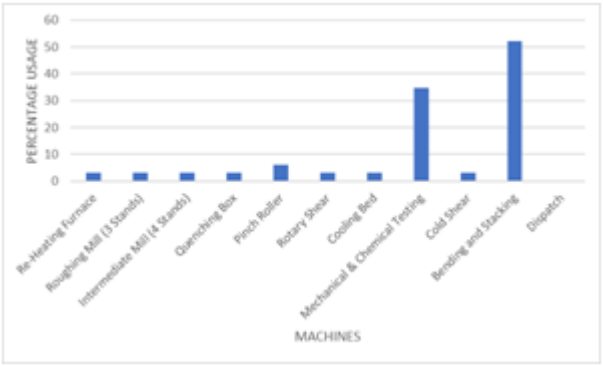
Percentage Usage Calculation:

- **For each machine:**

PERCENTAGE ANALYSIS TABLE

Machine	Monthly Usage (hours)	Percentage Usage
Re-Heating Furnace	319.8	(319.8 / 10616.52) * 100 = 3.01%
Roughing Mill (3 Stands)	319.8	3.01%
Intermediate Mill (4 Stands)	319.8	3.01%
Quenching Box	319.8	3.01%
Pinch Roller	639.6	(639.6 / 10616.52) * 100 = 6.02%
Rotary Shear	319.8	3.01%

Cooling Bed	319.8	3.01%
Mechanical & Chemical Testing	3686	(3686 / 10616.52) * 100 = 34.71%
Cold Shear	319.8	3.01%
Bending and Stacking	5529	(5529 / 10616.52) * 100 = 52.07%
Dispatch	22.12	(22.12 / 10616.52) * 100 = 0.21%
Additional Rotary Shear	Varies	Rarely Used
Additional Pinch Rollers	Varies	Rarely Used



INTERPRETATION

The bar graph visualizes the percentage usage of each machine involved in the production of steel TMT bars. Here's an interpretation of the findings:

Key Observations

High Usage Machines:

- **Bending and Stacking:** Account for the highest usage at 52.07%. This indicates that the bending and stacking process is a major part of the production workflow, consuming over half of the total operational time.
- **Mechanical & Chemical Testing:** The second-highest usage at 34.71%. This shows that a significant amount of time is devoted to ensuring the quality of the products through mechanical and chemical testing.

Moderate Usage Machine:

- **Pinch Roller:** With 6.02% usage, pinch rollers are used more frequently than most other machines but significantly less than bending and stacking, and testing. This higher usage can be attributed to its operation at multiple stages in the production cycle.

Low Usage Machines:

- **Re-Heating Furnace, Roughing Mill, Intermediate Mill, Quenching Box, Rotary Shear, Cooling Bed, Cold Shear:** Each of these machines has a consistent usage of 3.01%. This suggests that while essential, these machines do not dominate the production process in terms of time.

- **Dispatch:** With the lowest usage at 0.21%, the dispatch process requires minimal time compared to the other stages, indicating that the final step of moving products out is relatively quick and efficient.

VI. CONCLUSION

In conclusion, the restart of the 5S implementation project at Steelmax represents a pivotal step in the organization's quest for operational excellence, workplace efficiency, and continuous improvement. This initiative signifies a renewed commitment to creating a structured, organized, and safe work environment that not only enhances productivity but also fosters innovation. Through the initial sorting phase, Steelmax has begun to systematically eliminate unnecessary items, declutter workspaces, and establish a clear foundation for the subsequent phases of 5S.

The sorting phase has yielded critical insights into the current state of the workplace, uncovering both strengths and areas requiring significant improvement. This process has identified inefficiencies and safety hazards, providing a roadmap for enhancing organizational practices. The findings highlight opportunities to streamline operations, reduce waste, and improve overall safety. By addressing these areas, Steelmax can create a more efficient workflow, minimize downtime, and enhance employee satisfaction and morale.Implementing the recommended actions from the sorting phase involves a multifaceted approach. This includes not only reorganizing physical spaces but also fostering a cultural shift towards maintaining high standards of organization and cleanliness. Employee training and continuous education on 5S principles are essential to ensure that everyone understands and commits to the process. Regular audits and feedback loops will help sustain the momentum, ensuring that improvements are not just one-time

achievements but are ingrained in the daily routines of all employees.

To achieve long-term success, Steelmax must maintain a relentless focus on the principles of 5S. Leadership must demonstrate unwavering commitment by providing the necessary resources and support. Employee engagement is crucial; involving staff at all levels in decision-making and implementation will empower them and foster a sense of ownership and responsibility. This collective effort will create a culture of excellence and continuous improvement, where every employee contributes to maintaining and enhancing organizational standards.

Ultimately, the success of the 5S implementation project at Steelmax hinges on the collective effort and dedication of all employees. By working together towards a common goal, embracing change, and adhering to the principles of 5S, Steelmax can achieve significant and lasting improvements in workplace organization, efficiency, and overall performance. This will position the organization for sustained success, enhancing its ability to compete and thrive in the global market.

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