Implementation of 5s Methodology in Garment Industry

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***Abstract*- Today's manufacturers must contend with fierce international competition. Their understanding of the value of modern management philosophy in giving them a competitive edge in a free market environment is growing. In order to compete in the global market place today, quality and productivity must both be continually improved. Lean production is primarily used to boost output, enhance product quality and manufacturing cycle times, decrease inventory, shorten lead times, and get rid of manufacturing waste. The lean production philosophy employs a number of ideas, including Kaizen, Kanban, 5's, OEE, JIT, etc., This paper clearly explains the lean concepts, its principle, importance and benefits and Implementation of 5s.**

***Key words*- Enhance Product quality, shorten lead time, decrease inventory,5s.**

I. INTRODUCTION

Lean manufacturing is a production process based on an ideology of maximising productivity while simultaneously minimising waste within a manufacturing operation. The lean principle sees waste is anything that doesn't add value that the customers are willing to pay for.

The benefits of lean manufacturing include reduced lead times and operating costs and improved product quality. Also known as lean production, the methodology is based on a specific manufacturing principles that have influenced production systems across the world as well as those of other industries including healthcare, software and various service industries.

The core principle in implementing lean manufacturing is to eliminate waste to continually improve a process. By reducing waste to deliver process improvements, lean manufacturing sustainably delivers value to the customer.

The types of waste include processes, activities, products or services that require time, money or skills but do not create value for the customer. These can cover underused talent, excess inventories or ineffective or wasteful processes and procedures. Removing these inefficiencies should streamline services, reduce costs and ultimately provide savings for a specific product or service through the supply chain to the customer.

II. FIVE CORE PRINCIPLES OF LEAN MANUFACTURING

1. **Value**: Value is determined from the perspective of the customer and relates to how much they are willing to pay for products or services. This value is then created by the manufacturer or service provider who should seek to eliminate waste and costs to meet the optimal price for the customer while also maximizing profits.
2. **Map the Value Stream**: This principle involves analyzing the materials and other resources required to produce a product or service with the aim of identifying waste and improvements. The value stream covers the entire lifecycle of a product, from raw materials to disposal. Each stage of the production cycle needs to be examined for waste and anything that doesn't add value should be removed. Chain alignment is often recommended as a means to achieve this step.

Modern manufacturing streams are often complex, requiring the combined efforts of engineers, scientists, designers and more, with the actual manufacturing of a physical product being just one part of a wider stream of work.

3. **Create Flow**: Creating flow is about removing functional barriers to improve lead times. This ensures that processes flow smoothly and can be undertaken with minimal delay or other waste. Interrupted and disharmonious production processes incur costs and creating flow means ensuring a constant stream for the production or service delivery.
4. **Establish a Pull System**: A pull system works by only commencing work when there is demand. This is the opposite of push systems, which are used in manufacturing resource planning (MRP) systems. Push systems determine inventories in advance with production set to meet these sales or production forecasts. However, due to the inaccuracy of many forecasts, this can result in either too much or not enough of a product being produced to meet demand. This can lead to additional warehousing costs, disrupted schedules or poor customer satisfaction. A pull system only acts when there is demand and relies on flexibility, communication and efficient processes to be successfully achieved.

The pull system can involve teams only moving onto new tasks as the previous steps have been completed, allowing the team to adapt to challenges as they arise in the knowledge that the prior work is mostly still applicable to delivering the product or service.

5. **Perfection**: The pursuit of perfection via continued process improvements is also known as 'Kaizen' as created by Toyota Motor Corporation founder Kiichiro Toyoda (see 'When and Who Invented Lean Manufacturing?' above). Lean manufacturing requires ongoing assessment and improvement of processes and procedures to continually eliminate waste in an effort to find the perfect system for the value stream. To make a meaningful and lasting difference, the notion of continuous improvement should be integrated

through the culture of an organisation and requires the measurement of metrics such as lead-times, production cycles, throughput and cumulative flow.

III. WASTE

. Waste is anything which does not contribute the product transformation.. Non value added activities in the process line Each and every organization wastes up to 95% of their resources, while most commonly this value exceeding 70%. Even the best lean manufacturer's wastes up to 30% of their resource.

IV. 7 COMMON WASTES

- Over-Production
- Inventory
- Transportation
- Defects
- Motion
- Extra Processing
- Waiting
- Under-Utilized Human Resources

V. BENEFITS OF LEAN MANUFACTURING

Reducing or eliminating waste is essential to lean project management, but the benefits of lean manufacturing can be different depending on who is asked. Some say it is increasing company profit while others maintain its improvements are solely to create customer value and increase customer satisfaction. Some common goals follow.

- Improve Quality: To stay competitive, companies can't be complacent, but must meet customers' changing wants and needs. Therefore, processes must be designed to meet their expectations and requirements. Adopting total quality management can make quality improvement a priority.
- Inventory Management: Thanks to the just-in-time production method, lean manufacturing reduces excess inventory, which reduces costs and prevents production issues.
- Process Improvement: Lean production systems are always being improved, thanks to the "continuous improvement" lean principle. Value stream mapping it's essential for this.
- Eliminate Waste: Waste is bad for costs, deadlines and resources. It takes without adding any value to a product or service. By eliminating waste, a lean manufacturing system can produce better products, at lower costs.
- Reduce Time: Time is money, as the adage goes, and wasting time is therefore wasting money. This is especially true for the manufacturing industry. Reducing the time it takes to start and finish a project is going to create value by adding efficiencies. Learn and apply some time management strategies.
- Reduce Total Costs: Money is saved when a company is not wasting time, materials and personnel on unnecessary activities. Overproduction also adds to storage and warehousing costs. Understanding the triple constraint is the first step to understanding cost management.

VI . 5S

Seiri

5S starts with sorting. Sorting is the use of all machines, tools, and equipment to separate unwanted items. Define daily, weekly and monthly items and keep them separate. Items that are defective, unusable, or occasionally used in your store should also be defined. Keep a record of the waste of ready-made and new products that you no longer need. Each section of clothing arbitrarily stores many things. Therefore, for these, the first

Seiton

The order in which you set the 5S is important. All articles, sections and areas (In, Exist) should be clearly identified with labels and all should be well organized. Do not mix or hide items from the two categories in one place. Separation lines, passage markings and stairwells are clearly marked and clean according to standards. Make sure the exit is accessible and unlocked during working hours. If applicable, verify exit doors do not have panic hardware or lever style (one-hand one-move door opener). By strategically storing all your business materials in your clothing store, you can easily find and retrieve them when you need them. Therefore, all materials should be stored in order according to the set.

Seiso

The third S of 5S is Shine, which actually means cleanliness. All Items/Workplace Floors, walls, stairs, ceilings, plumbing, shelves, cabinets, shelving, machinery, storage, materials, products, lighting, anything that needs to be kept clean. Easy access to all cleaning tools and materials. An order of cleaning is defined, followed by a checklist, which is hung on a visible board. Do regular pest control to keep pests away. Cleanliness is not only a compliance issue, but also contributes to a healthy working environment in garment factories and offices.

Seiketsu

It means "standardized cleanup". It stems from a one-off neat and clean move that made the factory "shiny clean" and set the standard for cleanliness. Seiketsu makes it possible and viable to meet this standard. The first three steps of 5S are the key to implementing 5S in the workplace. This section describes visualization through information displays, associated SOPs, signs, color codes, and other markings installed throughout the factory, and procedures for maintaining the first three S's. Conduct five periodic checks against the

checklist, rate each area, and publish. If formal training is required, keep training records for improvement. These standardizations will improve operational efficiency in the apparel industry.

VII . BENEFITS OF 5S IN GARMENT INDUSTRY

Doing 5S right in the textile and apparel industry will give you the following benefits:

- Health and safety guaranteed
- Basics for implementing quality improvement
- Increased productivity
- Save time, money and storage space
- Minimize accidents and errors
- Increased efficiency
- First steps in lean practice
- Improve customer satisfaction
- Reduce storage time
- Reduce downtime and waste
- Good atmosphere at work
- Visualization and lableing
- Improving corporate image
- Optimization of organization and workplace according to needs
- Everyone knows their job responsibilities, when and where
- Disciplined housekeeping

VIII . ACTIONS NEED TO IMPLEMENT 5S IN GARMENTS INDUSTRY

- Take a "before" photo.
- Make sure the first three S are implemented correctly.
- All team activity documents/checklists should be published on the 5S board.
- Establish a routine and standard practice of repeating the first three Ss regularly and systematically.
- Standardize red tag procedures and holding area rules. Create a housekeeping maintenance system.
- Make a schedule for cleaning your workplace. A common approach is to delegate this to a cross-functional team.
- Inter-sectoral competition is a powerful way to maintain and increase interest in 5S.
- Assign work area and machine personnel. Regular inspections/audits and evaluations by a dedicated team (including senior staff) will continue.
- Praise and praise good practices and good performers instead of criticizing bad cases.
- Take an "after" photo and post it on the 5S board. Reward the highest scoring

Cleaning Schedule

Cleaning schedule																									Month:							
Cleaning	Duration	Responsible Person	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Floor Cleaning	Per Hour	Cleaner																															
Table,Rack and shelves Cleaning	Monthly Once	Cleaner																															
Dustbin Cleaning	Three Days Once	Cleaner																															
Fans and Light Cleaning	Monthly Once	Maintenance																															
Doors and Window	Monthly Once	Cleaner																															
Wall cleaning	Monthly Once	Cleaner																															
Machines	Daily Once	Operator																															
Equipment and tools	Weekly once	Operator																															
Signature																																	

IX . RESULT

Sample of 500 piece of t shirts is taken (The values are average values)
Time Taken Before implementation of 5s

Pattern making = 80 minutes
Cutting = 110 minutes
Sewing = 330 minutes

Ironing = 80 minutes
Packing = 65 minutes
Total = 665 minutes

Time taken after implementing 5S

Pattern making= 70 minutes
Cutting = 100 minutes
Sewing = 315 minutes
Ironing = 70 minutes
Packing = 60 minutes
Total = 615 minutes

Time taken before implementing 5s - Time taken after implementing 5s = Time saved

665-615 = 50 minutes

Time taken for 1 piece before implementation of 5s = 665/500
=1.33minutes
Price of one piece = 45 Rs

No of pieces can be produced in 50 minutes = 50/1.33
= 38 pieces
Amount saved in 50 minutes = 38*40
= 1520 Rs
In 665 minutes we can save 50 minutes.

For 1 month = 26 working days * 8 working hour

= 208 working hours

For 665 minutes (11 hours) we save = 1520 Rs

Then for 12,480 minutes(208 hours) we save amount of = 208/11

= 18.90*1520

= 28,741 Rs

Then for Amount saved for 1 year 280 working days , 280*8 = 2240 working hours

= 2240/11

= 203*1520

= 308,560 Rs

X. CONCLUSION

Lean manufacturing has emerged as one of the most important methods for cutting costs. Lean is manufacturing aims to produce high-quality goods in the most cost-effective and efficient manner while simultaneously reducing all forms of waste and non- value-added activity by incorporating less human effort, inventory, product development time, and space to become highly responsive to customer demand. The 5S system is a good place to start for any improvement project that aims to eliminate waste from the manufacturing process and, in the end, boost a company's bottom line production by making products and services better and cutting costs. As part of Continuous Improvement or Lean Manufacturing processes, many manufacturing facilities, from small businesses to large corporations, have chosen to adopt a "5S" workplace organizational and housekeeping methodology to reduce waste and improve quality. This idea is particularly appealing to more established fabricating offices hoping to work on their main concerncreation without the requirement for capital venture. One such industry, Machine Tools, to increase productivity and discovered an increase in productivity and profits through the successful implementation of the 5S methodology. The implementation of the 5S methodology had a number of secondary advantages, including safer working conditions and increased employee enthusiasm and punctuality. The 5S board need to spread the theory to each worker via preparing and mindfulness program and a persistent improvement action is expected to upgrade the creation and diminish the wastages.

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