# IMPLEMENTATION OF LEAN MANUFACTURING TOOLS IN THE AGRO-PROCESSING INDUSTRY

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## ABSTRACT

There are the certain fields which are demanding in todays trend. Small scale industry is one of the field. It plays an important role in the economy.It has emerged as a powerful source in providing relative a larger employment after agriculture.Global markets are continuously changing and demanding due to high quality and low cost such products can be produced using lean manufacturing. In an organization, The prime importance is given to the quality and productivity. A problems comes across due to the effects in the materials, downtime in the production, working conditions, and housekeeping etc. Identification of waste is critical to every organization. Lean manufacturing can apply to every process . It is can be used to Manufacturing equipments related to the Agro processing industry.For Sorting the various types of grains Lean manufacture, also Creates speedy, smooth and economical manufacture .

The main aim of our project is to implement The Lean tools in the Agro processing industry. By Identifying the Time analysis and Inefficiency of the areas and implement the Strategy which helpful to improve the working conditions in the organisations .

***Keywords:- Kaizen Tool, Kanban Tool Process 5S Pillar, Lean Manufacturing.***

## INTRODUCTION

1)Lean manufacturing is a method of manufacturing goods aimed primarily at reducing times with in the production system as well as response times from the supplier and customers. It is closely related to another concept called just in time.

2)Toyota, Ohno, and Taylor are just a few of many luminaries who have shaped the history lean principles and manufacturing resources.

3)Toyota is the most common name we associated with lean principles

4) Lean was first introduced in venice in the 1450s

5)Henry Ford was the first person to integrate the idea of lean into a manufacturing system.

6)Henry ford who has experimented with interchanging and moving different parts in orde

7)To standardize work, proposed the flow of production in 1913.

Historically, agriculture has always had problems with operational costs and prices, becoming a relevant addressed factor because of the focal reality and variability in price and income, with economic problems standing out: the general problem of income and agricultural uncertainty. Industrial concepts and methodologies can be used to improve these agro-pastoral processes by focusing on reducing losses and waste and supporting the literature. In recent years, several industries and sectors have adapted to lean production (LP) or lean manufacturing (LM) to become more efficient, for example, in the service sector, administrative processes , healthcare , and public administration . Adapting manufacturing systems to new principles and technologies is an important measure of staying competitive and striving for the future. It is a challenge for the entire organization, not just on the

production floor. The same logic has been applied to farms, aiming at large-scale production, standardization, and operational management.

## LITERATURE REVIEW

**A) Philosolopy of Lean production**

It gives the concept of Philosopy of Lean production That emphazies The minimum amount all of resources including time used in Various activities in the enterprice.Cox et.al, It involves the identifying.[2] The value activities in design, production and supply chain management[4] and deling with the customer, lean production employee in terms of multiskilled worker at all the levels in the organization use of highly flexible

organization use of highly flexible automatic machines to produce volume of products I potentially enormous variety

**B) Time Measurement**

It teaches the method of time measurement and line, Efficiency and reduce cycle time in the assembly line 2]And improve the efficiency in product line. Santosh kumar et.al,

**C) Scrape loss**

It gives methodology for implementation of VSM [2]and apply [3]5S pillars and kanban system for reduction of work in the process inventory and lead time pravin et.al,

**D) Total production management**

The goal of the eachTPM action team is to get out of business of repairing broken machines and into the business of preventing machine failures and other productive losses [4].TPM activities by providing the lead members with there machine issues, observations, data and ideas for improvements[6].kumar and kumar et.al,

## MATERIALS

There are various Machines which are manufacture in the Agro processing industry For the manufacturing of machines various sheet metal is used because sheet metal Sheet metal fabrication is the compressive method involving all processes to turn sheet metal into a desired part or product. Identifying what sheet metal materials to use in your manufacturing product depends mainly on the intended application for your fabricated parts.

1)Formability 2) Weldability 3) Weldability

4)Corrosion resistance 5)Strength 6) Weight

3.2 Stainless Steel

The most popular material for sheet metal fabrication is stainless steel, which contains alloy components and at least 10.5% chromium, making this material corrosion-resistant, shiny, and durable. Stainless steel sheet metal has three common grades, and they are:

- Austenitic stainless steel. This widely used grade is non-magnetic and labeled as 300 series stainless steel. It is known for its formability and resistance to corrosion because of its low carbon components and high levels of nickel and chromium elements.
- Ferritic stainless steel. This metal grade is magnetic, non-heat-treatable, and labeled as 400 series stainless steel. It contains little to no amount of nickel and 11-30% chromium. It is commonly used for non-structural applications that require good corrosion resistance, like decorative or aesthetic applications.

- Martensitic stainless steel. This grade offers both corrosion resistance and heat treatability. Martensitic contains no nickel and features a wide range of hardness and strength levels.

**Cold Rolled steel**

- This sheet metal type, also known as CRS or cold rolled steel, is essentially hot rolled steel that has been further processed to achieve an exceptionally smooth finish. The cold rolling process allows the steel to cool down at room temperature and undergo annealing or temper rolling. The process produces steel with closer dimensional tolerances. It offers a broader range of surface finishes and is up to 20% stronger than hot-rolled steel.
- Cold-rolled steel comes in two most common CRS alloys: 1008 alloys with weldable features and 1018 alloys or carbon steel alloys that can easily be machined.

**Alluminium**

Aluminum is a commonly utilized material in sheet metal fabrication. With nearly 1/3 of steel density, aluminum is ideal for applications requiring lighter parts or components. It exhibits suitable properties, including a corrosive-resistant ability even without a coating and tensile strength and flexibility, matching broad customizability for processes like laser cutting, welding, and machining. Moreover, aluminum is a moderately-priced material used in various industries and application.

HRPO Sheet (Hot Rolled Pickled and oiled)

Steel has been used to remove the surface impurities HRPO steel sheet and coiled have improved workability and ductility creasts cost saving opportunity associated with downstream processing like Bending ,Welding ,Laser cutter and painting It is oiled to prevent rusting and recoiling.

**Implementation of Kaizen tool**

Kaizen Tool

Kaizen emphasizes making continuous improvements in quality, efficiency,and waste reduction. The 5S Methodology is the integral part of kaizen.Seri(sort),Seiton(straighten),Seiso(shine), Seiketsu( standardize) Shitsuke (sustain).

**1. Sorting and Set in order**

In Sorting we distinguish the useful and scrap items .The Scrap items were kept all aside at one location & we named the location as scrap yard which is just located besides the entrance of the storeroom.


Figure 4.3 Scrap area of the Store room

The above image is of the company s store room when we have segregated the scrape and placed it besides the entrance and named it as a scrap yard. In this scrap yard we placed all the scrap at one time and some of the scraps are placed at Different location due to the Storage of space

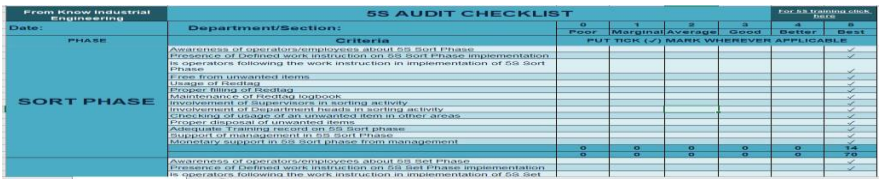
In store room there are lots of materials are present such as cutting wheel,grinding wheel,wiremesh, different types of valves & fasteners etc We also made a list of all the materials which are present in the company & Then sorted these materials according to frequent used, seldom used and rarely used.After removing scrap we sorted and set in order the useful materials according to there respective sizes . we diferenciated grinding wheels and cutting wheels according to there sizes i.e 4",5" Sorted and arranged the flanges in accordance to there sizes i.e 20NB,25NB,50NB,80NB,65NB,100NB .Then we differenciated the special welded rod (316L,303L,309L)sorted all the fasterners in size ¾,5/8 and also ejectors, spanners, nameplate sorted as per size Differenciated coupling according to sizes (1",1/2",3/4") sorted all type of gate valves (Flange end 1", threaded Butt ½"& 1") Ball valve flange. The scrap items consists of MS plate cut,5S perforated sheet, wire mesh cut piece manifold valve.7" then we sorted the fittings into there following categories as Butt welded elbow, socket welded elbow & equal tee.

**2.Cleaning**

Cleaning is the third method of 5S technique we implemented this method as we were proceeding the sorting method .As we were proceeding the sorting we were differenciting used & not used items and then we Cleaned the whole workplace.

**3) Standardize & Sustain**

The fourth "S" stand for Seiketsu ( standardize ). In this step standard procedure auditsheet and work. Instructions are prepare to maintain 3S.Before starting of work to check and correct the sorted items placing equipments at its place and cleaning etc,and give proper reading on auditsheet and create awareness in employee to maintain this thing on production line From non production line.



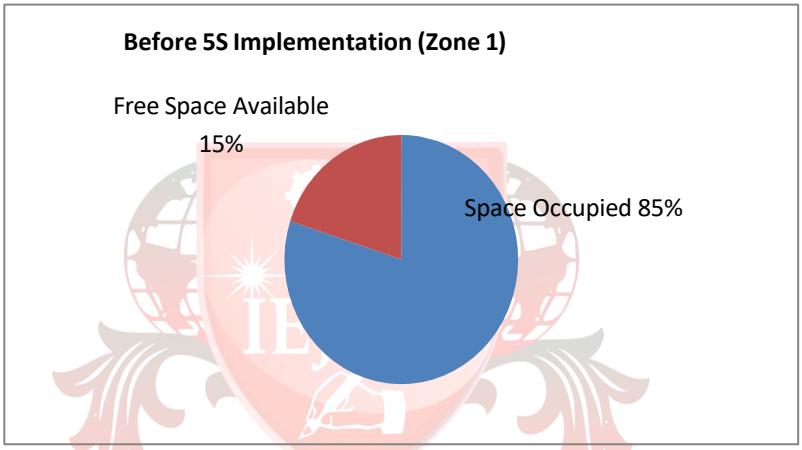
| From Know Industrial Engineering | 5S AUDIT CHECKLIST | | | | | | For 5S training click here |
|---|---|---|---|---|---|---|---|
| Date: | Department/Section: | 0 Poor | 1 Marginal | 2 Average | 3 Good | 4 Better | 5 Best |
| PHASE | Criteria | PUT TICK (✓) MARK WHEREVER APPLICABLE | | | | | |
| SORT PHASE | Awareness of operators/employees about 5S Sort Phase | | | | | | ✓ |
| | Presence of Defined work instruction on 5S Sort Phase Implementation | | | | | | ✓ |
| | Is operators following the work instruction in implementation of 5S Sort Phase | | | | | | ✓ |
| | Free from unwanted items | | | | | | ✓ |
| | Usage of Redtag | | | | | | ✓ |
| | Proper filling of Redtag | | | | | | ✓ |
| | Maintenance of Redtag logbook | | | | | | ✓ |
| | Involvement of Supervisor/Lead in sorting activity | | | | | | ✓ |
| | Involvement of Department heads in sorting activity | | | | | | ✓ |
| | Checking of usage of an unwanted item in other areas | | | | | | ✓ |
| | Proper disposal of unwanted items | | | | | | ✓ |
| | Adequate Training record on 5S Sort phase | | | | | | ✓ |
| | Support of management in 5S Sort Phase | | | | | | ✓ |
| | Monetary support in 5S Sort phase from management | | | | | | ✓ |
| | | 0 | 0 | 0 | 0 | 0 | 14 |
| | | 0 | 0 | 0 | 0 | 0 | 70 |
| | Awareness of operators/employees about 5S Set Phase | | | | | | ✓ |
| | Presence of Defined work instruction on 5S Set Phase Implementation | | | | | | ✓ |
| | Is operators following the work instruction in implementation of 5S Set | | | | | | ✓ |

The fifth ‘S’ stands for shitsuke( Sustain) is about the mental and physical disciplines required to maintain the others 4S items. It is done with the help of co-operation between employees, Storekeeper, engineer and manager.

## 5S Approach in the Company

The result in this study, we observed 15% free space was available before implementation of 5S and after implementing 5S it is increased to 35%.

Figure 6.1 Spiral Chart





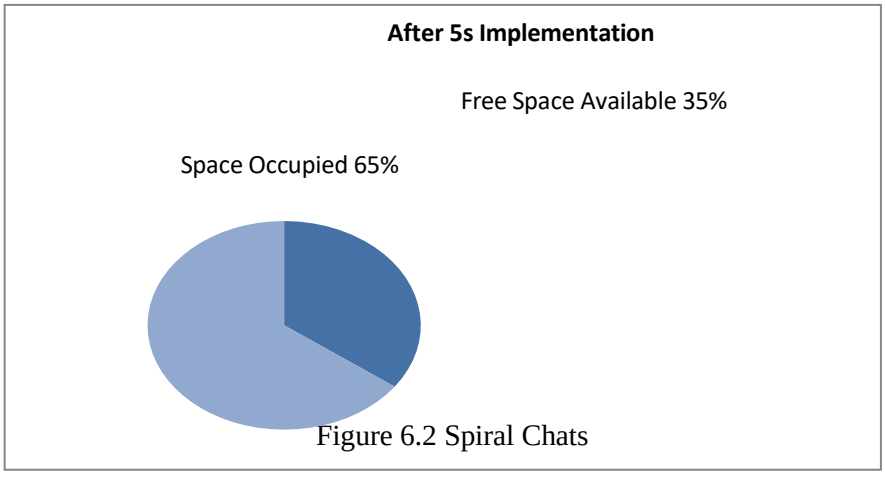




Figure 6.2 Spiral Chats

## CONCLUSION

The Project study proves that the 5S Methodology is one of the most appropriate tool as well as beneficial one for any industry who wants improvements in their existing system. In addition to this, it also gives the 5S Ratings helps to enhance the work productivity along with time efficiency . It leads to minimization of the cost and the standards of the company go towards upside.

- Unwanted material is removed from the workspace,
- More space is now available for utilization.
- The time required for searching the required things are reduced up to 50%
  Because of proper arrangements.
- As the tools are always clean and in good condition, quality of finished product is increased.
- Cost engaged with scrap is saved.

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