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DESIGN AND IMPLEMENTATION OF PENNAR INTEGRATED MANAGEMENT SYSTEM (PIMS) MODEL THROUGH LEAN PRINCIPLES AND PRACTICES

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Abstract

Now a day's traditionally operated discrete manufacturing industries are facing serious problems like lower machine and manpower productivity, longer production lead time, Low yield high rework, poor line balancing, lack of standardized work process and performance measurement system for the employee, high work-in-process, low production capacity, high labour (operator) absenteeism, high rework and poor resource utilization are among others. Lean is an optimized manufacturing approach that aims to streamline the flow within an organization. Today lean is not solely limited to the continuous process manufacturing industry, companies with discrete manufacturing facility are increasingly adopting and modifying lean strategies and practices to suit the needs and thus streamlining their processes. The primary topic of interest in this paper is to improve productivity through quantitative research methods and different lean manufacturing tools such as value stream mapping (VSM), standardization of work process, line balancing, and 5S and to address the solutions.

The case studies illustrate the application of LEAN tools, their sustainability and effectiveness in improving the overall operational performance by elimination /reduction of wastes (Muda) in our organization. The following LEAN tools are applied -5S, Value stream mapping (VSM), KAIZEN-Continuous Improvement, Integrated management systems methods (ISO methods), Productivity based manpower planning, KAIZEN improvements, Quality circles, suggestions schemes.

Keywords: Discrete manufacturing system, Lean, Value stream mapping, KAIZEN, Integrated Manufacturing System.

1.0 INTRODUCTION

1.1 Background

This Paper addresses the application of lean manufacturing concepts in one of the discrete steel processing industry named Pennar Industries Ltd which focussed towards achieving sustenance through its management systems called Pennar Integrated management Systems (PIMS)

The basic idea behind the system is eliminating waste. Waste is defined as anything that does not add value to the end product from the customer's perspective. The primary objective of lean manufacturing is to assist manufacturers who have a desire to improve their company's operations and become more competitive through the implementation of different lean manufacturing tools and techniques.

1.2 Problem Statement

Now a day most of the industries both in the process & service sector have been trying to adopt new business initiatives in order to stay alive in the new competitive market place. "**Lean Manufacturing**" is one of such initiatives that focus on cost reduction by eliminating non-value added activities.

It has been proved & being proven that application of lean tools, have yielded enormous amount of profits at several organisation's both in service & process sector. Organisation have also been reluctant to adopt lean manufacturing tools and techniques because of several reasons such as cost of implementation, Competency & retaining, unaware of usefulness, fear of skill level, multi-tasking ability & upcoming challenges, lack of cross

functional knowledge, lack of motivation, lack of Vision & Mission, lack of systems in place to direct, drive & utilize the potentiality. This paper is to demonstrate how Pennar have addressed all the above concerns through a single window called Pennar Integrated Management systems.

1.3 Objective

The idea behind this paper publishing is to demonstrate how Pennar Integrated Management systems have succeeded in implementing tools of lean manufacturing to its discrete manufacturing environment and to showcase their benefits at a specific process zone.

The objective is to systematically demonstrate how lean manufacturing tools when used appropriately can help the discrete manufacturing industry to eliminate waste, have better inventory control, better product quality, and better overall financial and operational procedures. In this paper Pennar Industries Ltd is used to represent the discrete manufacturing environment.

2.0 METHODOLOGY

The essential target of this study is to develop a conceptual framework for implementing Lean management in Pennar industries Limited-A discrete manufacturing environment. The nature of the framework aims to be very general in order to guarantee its use.

The purpose of the work can be classified as a descriptive research. It is conducted to describe the phenomena of Lean management in steel business as they currently prevail. Information and characteristics of the pertinent issue of Lean management's implementation in discrete manufacturing organizations is identified and gathered.

The study's process of research can be characterized as qualitative. For addressing the research questions, qualitative information is collected and analyzed them with interpretative rather than numerical methods.

With respect to the research's outcome it can be described as application type of research. The underlying research problem is of less specific nature and the study is being conducted predominantly to improve the general understanding of implementing Lean management practices in steel industry with an emphasize on the immediate application of the developed framework. The study aims at making a contribution to the general knowledge and theoretical understanding of Lean manufacturing system.

3.0 FRAME WORK OF IMPLEMENTING LEAN THROUGH PENNAR INTEGRATED MANAGEMENT SYSTEM (PIMS)

Any manufacturing industry has to put its continuous efforts for its survival in this current impulsive and competitive market conditions. In order to handle this critical situation, manufacturers are trying to implement new and innovative techniques in their manufacturing process by adopting systems and principles related to LEAN manufacturing system.

Considering the Challenges being aroused while implementing any of the change Management programmes like Lean in traditional organization, customized Management systems have been defined ensuring the standard industrial compliances & it is as prescribed.

The Pennar Integrated Management System (PIMS) arose out of necessity in response to compete and survive in this critical market conditions and to provide customer with the highest quality products at the lowest possible cost in a timely manner with the shortest possible lead times and cycle times

PIMS MODEL OVERVIEW-STEP BY STEP IMPLEMENTATION

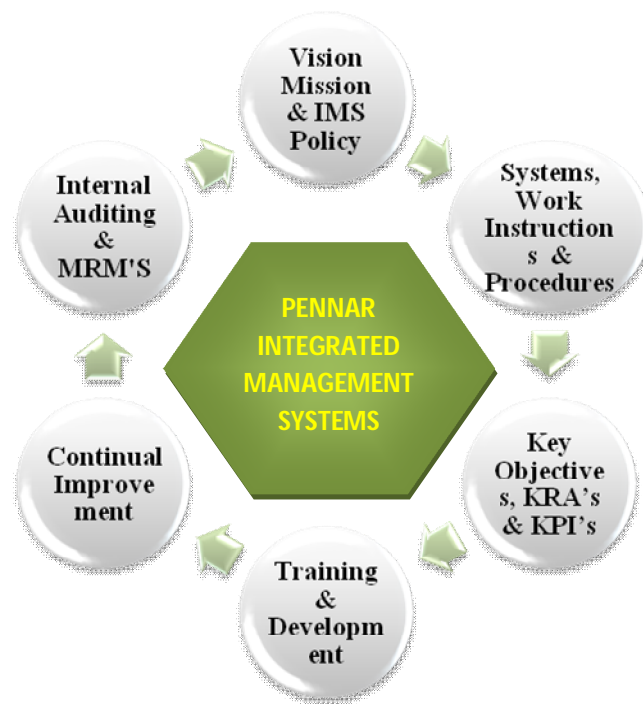


Fig 1. Model to represent step by step overview of PIMS.

Pennar integrated Management systems mainly focused & believed in competency management over many other management systems. In order to meet the challenge of competency and sustained continual improvement, it has chosen internal auditing system as an important tool to develop cross functional knowledge, motivational skills, ability to introspect systems & procedures, supervisory skills, evaluatory skills, relationship between Managers (Including cross functional managers) and auditors as well as auditees.

As effectiveness of internal auditing involves the understanding of management needs and working with management to serve those needs. Pennar has considered that understanding is an essential ingredient for the establishment of internal audit credibility such that management will respect and listen to internal auditor's counsel with which bottom line gets motivated, and will get enriched with skills set like team building, Multi-tasking, supervision, train the trainer skills etc. and hence will drive the operations with a motto of continual improvement all the times.

The continuous improvement in the Pennar Integrated Management System is ensured through the implementation of Quality Policy and Objectives, analysis of data obtained from various performance trends, details obtained from corrective and preventive actions and execution of monthlyreviewmeeting (MRM) mechanism

The output from the review shall be consistent with the commitment for seven management goals, seven focus areas and seven zero targets for continual improvement and shall include any decision and actions related to possible changes to

- Improvement of product related to customer requirements
- Quality Policy and Objectives Resources
- Production ,Performance & Productivity
- Improvement of effectiveness of PIMS and its processes and other elements

3.1 PIMS Philosophy

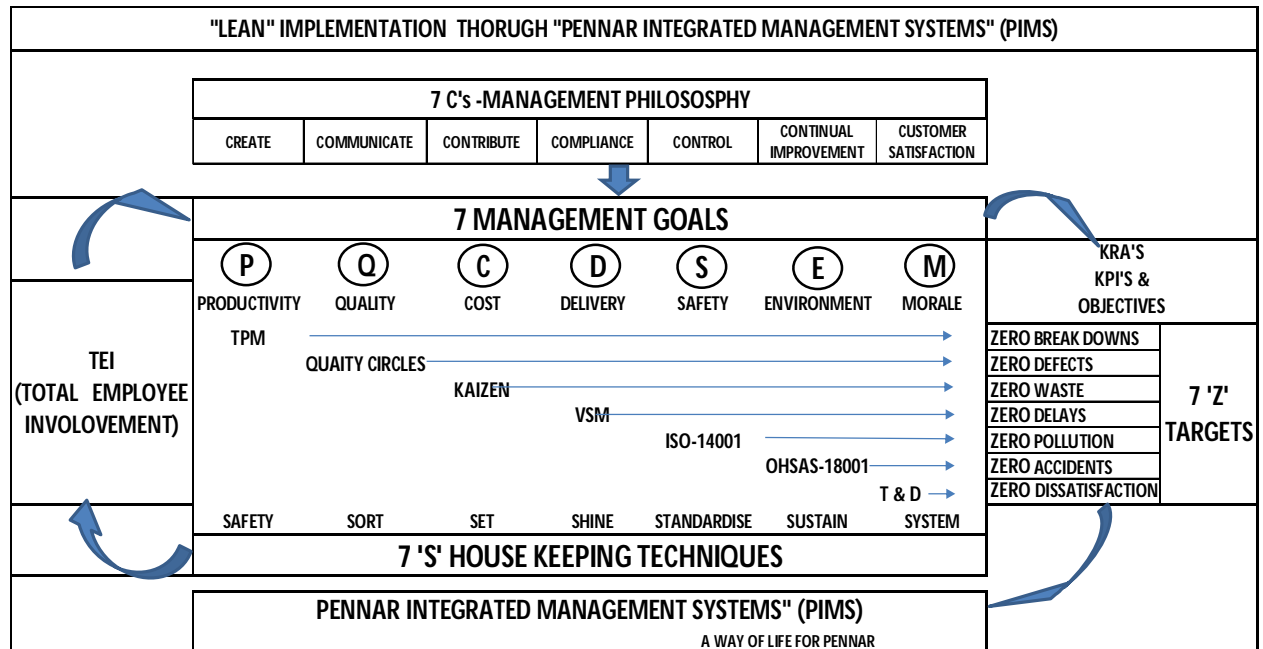


Fig 2. Design to represent PIMS Philosophy

3.2 SEVEN MANAGEMENT GOALS OF PIMS

The Pennar Integrated Management System (PIMS) has got the following seven basic goals that are consistent with the defined objectives and values of IMS. The seven management goals are as follows:

- **Productivity:** This focuses majorly on Product and process Yield/machine OEE/Manpower productivity /machine MTBF & MTTR
- **Quality:** Zero Customer Complaints – Internal & External, COPQ, Quality Standards adherence, and Quality of Life
- **Cost control / cost reduction:** Commercial cost, input – output balancing w.r.t Power, Fuels and all Resources
- **Delivery:** Creating confidence, Fulfilling promise, Customer Delight
- **Environment:** Air, Water, Land, Natural Resources, Flora, Fauna, Humans and their interaction
- **Safety:** Zero incidents, Safe Work Condition, DOs & DONTs
- **Morale:** Training on Soft skills, IMS, Job Satisfaction, Total Employee Involvement (TEI)

PHASE 1: ESTABLISHMENT OF A LEAN FOUNDATION- 5S SYSTEM IMPLEMENTATION

“A place for everything and everything in its place” is the mantra of the 5S method

5S is a method for workplace organization contributing to becoming a highly organized and efficient business. It must be considered on a micro and macro level meaning that every workplace itself but also the organization need to be structured according to the 5S principles.

5S is a system to reduce waste and optimize productivity through maintaining an orderly workplace and using visual cues to achieve more consistent operational results. The term refers to five steps – SORT, SET IN ORDER, SHINE, STANDARDIZE, and SUSTAIN – that are also sometimes known as the 5 pillars of a visual workplace. 5S programs are usually implemented by small teams working together to get materials closer to operations, right at workers' fingertips and organized and labelled to facilitate operations with the smallest amount of wasted time and materials.

The following steps are the major steps in implementing 5S system in PIMS

Step 1: Formulation of 5S steering committee, which consists of chairman, coordinators and facilitators

Step 2: Set up Zones and sub zones to concentrate and work on 5S principles and practices

Step 3: Zone wise leaders and sub leaders identification with clear roles and responsibilities

Step 4: Training of employees on 5S principles and practices

Step 5: Planning of progressive 5S audit to evaluate the effectiveness of implement.

The following exhibits clearly identifies the result of implementing 5S system across complex



Fig 3. Visual Management of PIMS, 5 'S' Culture

PHASE 2: STABILIZE AND CONTINUOUS IMPROVEMENT THROUGH TOTAL EMPLOYEE INVOLVEMENT-KAIZEN SYSTEM IMPLEMENTATION AND QUALITY CIRCLES INITIATION

To address the major problems in company related to man, machine, material and method and to solve major quality issues, top managerial personals, engineers and operators levels, after detailed study and investigation on LEAN tools and practices, and by considering different factors found and decided to initiate KAIZEN-Continuous improvement technique.

In Japanese, Kaizen means “small, incremental, continuous improvement,” and the English translation is “continuous or continual improvement.” Kaizen is a philosophy that focuses both on the process and the results. This involves all groups of employees through small group activities like Quality circles, suggestion Schemes etc

The following exhibits clearly identifies the result of implementing Kaizen and QC circles initiation across complex

The following exhibits clearly identifies the result of implementing KAIZEN system across complex

Kaizen-in house development of punching press with 3-punching stations replacing individual presses



Fig 4. Visual Management of PIMS, KAIZEN Culture

PHASE 3: WASTE IDENTIFICATION AND REDUCTION- VALUE STREAM MAPPING SYSTEM IMPLEMENTATION

One of the most essential Lean tools for getting aware of the business processes is Value Stream Mapping (VSM). In the initial phase VSM should focus on mapping the current processes in the organization. Later on in the second step the map of the current processes will be used as a basis to work out the improvements in the operations. The overall purpose of VSM is to shift the current employees' perspective and let them see the current processes with a new mindset focused on value and its flow.

Value stream mapping, a lean manufacturing tool, which originated from the Toyota Production System (TPS), is known as “material and information flow mapping.” This mapping tool uses the techniques of lean manufacturing to analyze and evaluate certain work processes in a manufacturing operation. This tool is used primarily to identify, demonstrate and decrease waste, as well as create flow in the manufacturing process. VSMs can be created merely using paper and pencil; however more advanced maps are created using Microsoft Visio as well as Microsoft Excel.

The following steps are the major steps in implementing VSM system

- Step 1: Identification of critical areas, where values stream mapping is required
- Step 2: Mapping of Present state mapping
- Step 3: Identification of Value adding and non-value adding activities in flow
- Step 4: Mapping of future state mapping
- Step 5: Implementing the future state mapping system



Fig 5. Visual Management of PIMS

Apart from the above Steps of implementation 7 zero targets were set for everyone and every area

- **Zero accident:**LTI, Medical, First aid Incidents
- **Zero discharge:** Water, oils
- **Zero pollution:** Air, water, land, natural resources
- **Zero waste:** Solid, hazardous, e-waste, canteen bio-waste
- **Zero defects:**Raw material, in-process, finished products
- **Zero delays:**Man, material, machine movement, customer supplies
- **Zero breakdowns:** Control, reduce, prevention of breakdowns

4.0 FINAL SUMMARY AND CONCLUSION

Implementation of the Pennar Integrated Management system into a dynamic lean manufacturing philosophy, supported by integrated management system (IMS) systems consists of ISO 9001- Quality Management System, ISO 14001-Environment Management System and OHSAS18001- Safety –Health management system standards – principles

The following are the major achievements after successful implementation of PIMS across complex

- **Yield-0.5%** increase (91.15% as against 90.62%)
- **Power Units Consumption-100 Units** reduction, when compared to past performance
- **Manpower productivity** increased by **2%**
- **Shop floor space utilisation** increased by 10% and
- Many other intangible results and achievements are accomplished.

Managing ongoing change and improvement is essential .If, through the participation of all employees and work teams, we at Pennar Industires achieved considerable results in areas of yield ,productivity, safety and systems by maintain reliable equipment's, meeting significant level all production requirements, provide outstanding internal and external quality through In-Station Process Control and through small kaizen ideas, we have provided ourselves a safe and rewarding place to work and outstanding quality and cost for our customers.

4.1 Future scope of study

In order to continue to compete in the global steel market and provide for the needs of customers employees and investors, it is essential that all employees become experts in the principles of the Pennar Integrated Management System. The success of the system requires everyone's participation., separate initiatives in promoting TEI –total employee involvement ,in the form of KAIZENS, Quality Circles , Suggestions schemes and monitoring methods needs to be designed in a customised way and measured for the performances reflecting bottom line in the balance sheet of orgnaisation.

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