

## **Lean Management**

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**ABSTRACT:** STATEMENT: The face of manufacturing has changed in the space of a decade. Competitive forces are intensifying. Companies adapt various techniques to be successful. Lean manufacturing is one of them to thrive in such an environment. PROCEDURE/APPROACH- Lean is the latest buzzword in today's industry. It is a philosophy as well as a set of methods for dramatically reducing time from customer order to building and shipping product. Lean manufacturing is a systematic approach to identifying and eliminating waste (non-value added activities) through continuous improvement by flow of product at the pull of the customer in pursuit of perfection. Lean systems are highly flexible to customer requirements. Lean is all about doing more with less with required quality standards. For companies to successfully implement lean it is very much required that they understand the problems also that are associated with these. A thorough understanding of the problem help companies think of counter measures much before implementing lean than at a later stage. ORIGINALITY/VALUE- This paper gives a complete guide to lean manufacturing by discussing about the advantages of lean manufacturing, a systematic and scientific method for adapting this and the problems faced during implementation.

**Keywords:** *Lean manufacturing, eliminate waste, highly flexible, quality standards.*

### **I. INTRODUCTION**

#### **UNDERSTANDING LEAN**

- Doing more with less by employing 'lean thinking'.
- Lean manufacturing involves never ending efforts to eliminate or reduce 'MUDA' (Japanese for waste or any activity that consumes resources without adding value).
- The core philosophy behind lean is that customers do not pay for the mistakes or waste but value.

#### **LEAN MANUFACTURING DEFINITION**

Lean manufacturing is defined as "a philosophy based on Toyota production system and other Japanese management practices those strives to shorten time line between the customer order and the shipment of the final product by consistent elimination of waste".

#### **TRADITIONAL VS LEAN MANUFACTURING**

The over-arching "big picture" difference between traditional and lean manufacturing involves a totally different mindset. To be more specific traditional manufacturing refers to manufacturing principles focused on producing a certain set number of products each period and holding a reserve in case of unexpected demand or shortages. Whereas, lean manufacturing is a strategy which seeks to save money by matching production flow with changing demand and focusing on efficiency instead of reserves and this requires lean accounting.

#### **PROBLEM STATEMENT**

In this paper following problems in the manufacturing sector are considered and analysis is made to find out the root cause and counter measure to each problem:

- To find out the operational difficulties in implementing pull-push inventory strategy.
- To find out the root cause and counter measure for "Improper Kanban Handling" problem.
- To find the basic process and benefits in implementing fundamentals of KAIZEN.
- To develop some scientific techniques to work smarter in small parts storage system.

#### **OBJECTIVES OF THE STUDY/CONTRIBUTION OF PAPER**

The three main or basic objectives of this paper are:

- QUALITY: to improve the quality level of production system by means reducing no of errors and rejects.
- COST: to generate more finished products at the end of process with the same amount of initial resources
- DELIVERY HEAD: to lessen through time, which is takt time from supply to pay receipt of produce.

#### **PRODUCTION SYSTEMS**

There are 2 basic types of production systems. They are:

-Push production system: - In this products are being produced for which there is no real customer demand. Production is basically based on projected or forecasted demand.

-Pull production system: -In pull production system products are produced based on customer demand.

Merits of pull system over push system:

-The main problem in the push system is the inaccuracy of the forecasts. It seems that no matter how sophisticated the forecasting techniques are employed, the volatility of the markets ensures that the forecasts will be wrong! Whilst many forecasting errors are the result of inappropriate forecasting methodology. The evidence from most market is that demand volatility is tending to increase, often due to competitive activity, sometimes due to unexpected events etc. in situations like this it is very difficult to predict anything about the market. The simple solution is to adapt pull system based on today's market condition.



Figure 1: Pull VS Push system

### 3. JUST IN TIME PHILOSOPHY

Just in time, is more than an inventory reduction system. Material progresses from the earlier processes towards the later ones to pick up the right part in the quantity needed. Communication between the process is very essential to indicate the needs. This can be achieved by continuous standardized work which are:

$$\text{Cycle time} = \frac{\text{total operating hours in a day}}{\dots\dots\dots} \quad (1)$$

$$\frac{\text{Quantity required/day}}{\dots\dots\dots} = \frac{\text{quantity required/month}}{\text{Number of operating days in a month}} \quad (2)$$

-Work sequence refers to the sequence of operations in which items are processed

-Standard inventory is the minimum intra process work in process needed for operations to proceed.

### 4. KAIZEN (CONTINUOUS IMPROVEMENT)

It can be simply defined as “An organization wide process of focused and sustained incremental innovation”

Thus kaizen can be comprehensively described as small step, high frequency, short cycles of change which have a little impact when viewed alone, but which cumulatively can make significant contribution to performance. This comprehensive description can be graphically depicted as follows:

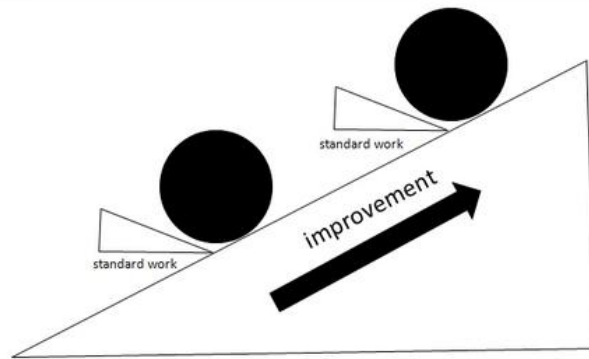


Figure 2: cumulative efforts vs performance

At first the progress is slow. The early part of the improvement curve is nearly flat. As the object under scrutiny is better understood the learning accelerates and improvement consequently occurs at an accelerated rate. This incremental improvement over time, lead to substantial improvement. As curve illustrates, at some point that improvement will slow and gain in improvement will get lesser and lesser. Finally any further improvement comes at great expenses.

Benefits of continuous improvement:

-major attraction of continuous improvement is that it does not have to involve large capital investment, because at the heart of the concept is the belief that positive change occurs through investing in people.

-continuous improvement can result in tangible and intangible benefits and thereby improving the profits and relationships among the workers.

**5. KANBAN SYSTEM**

Kanban or sign board is the means for conveying information about picking up or receiving the production order. Consider a super market store where the later process (customer) goes to earlier process (super market) to required parts (commodities) at the time and in the quantity needed. The earlier process immediately produces the quantity just taken (restocking the shelves). This idea helps us in achieving just in time and goal of produce by using a technique called KANBAN.

The kanban carries information about the product which the customer are checked out through cash register. Cards that carry information about the types and quantity of products bought are then forwarded to purchasing dept. Thus the products in a store correspond to the inventory in the production plant.

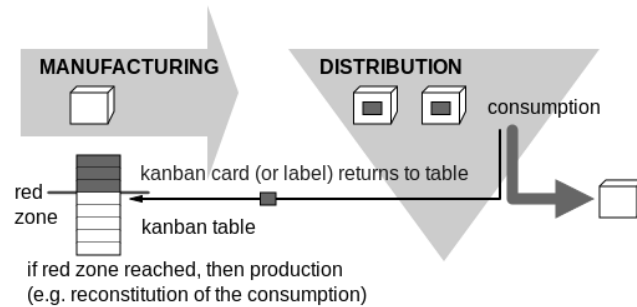


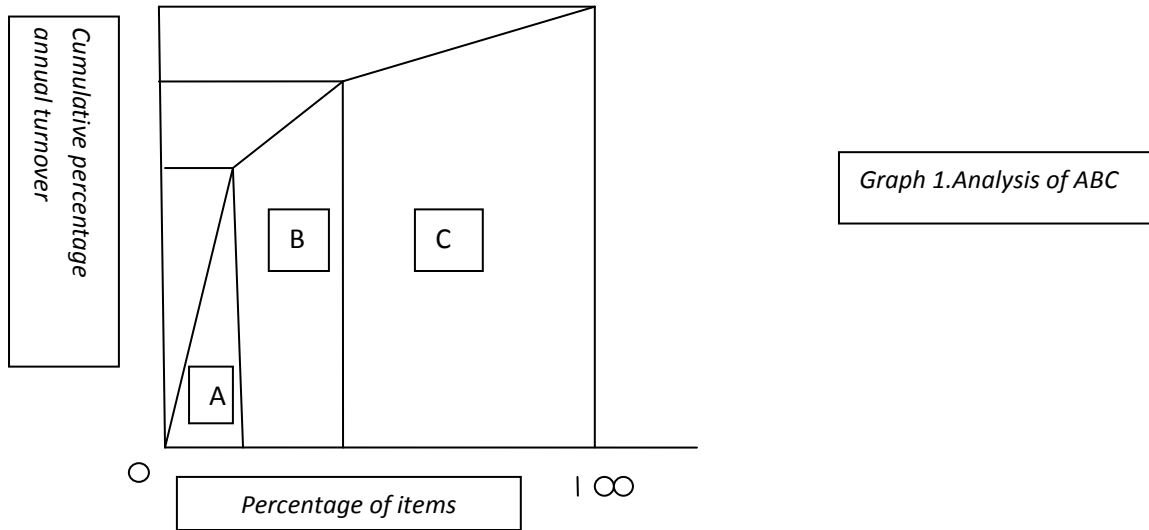
Figure 3: Getting started with KANBAN

**Table no 1:** counter measure for improper handling of Kanban

Sr. No.	Functions of Kanban	Rules for Use
1	Pick up and transport information	Later process picks up number of items indicated at earlier process
2	Production information	Earlier process produces items in the quantity indicated
3	Prevents over production and excess transport	No items are made or transported without kanban
4	Serves as a work order attached to goods	Always attach kanban to goods facing the operator
5	Prevents defective products and maintains inventory control	The result is 100% defect free parts and decreases their sensitivity

**6. SOME SCIENTIFIC TECHNIQUES TO WORK SMARTER IN SMALL PARTS STORAGE SYSTEM.**

-ABC (always better control) analysis for better material control in storage system as shown below



A-ITEMS	B-ITEMS	C-ITEMS
Very strict control	Moderate control	Loose control
No or very low safety stock	Low safety stock	High safety stock
Frequent ordering	Moderate ordering	Bulk ordering
Weekly control statements	Monthly control statements	Quarterly report
Low lot size	Medium lot size	Moderate lot size

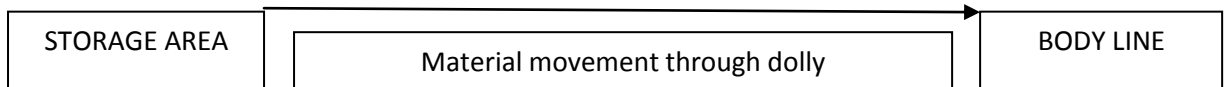
-Rejection-Rejection and waste control mechanisms for CKD and very small local parts: in small parts storage area “scattering of CKD and very small parts“ is a common problem. Neglect towards these scattered parts lead to man-hour wastage later to segregate and rearrange the parts.

-A magnetic stick can be incorporated along with the 5-S tools to collect scattered parts.

-This problem can be eliminated by including photographic picture of part in a Kanban.

-Transfer batches means “quantity of particular item moved to line through dolly at a time”. Small transfer batches are always better.

**Fig no 3:** number of particular item =transfer batch



**Table no 2:** Transfer batch depends on following factors and the some of the ways to overcome them:

SR .NO	FACTORS	COUNTERMEASURES
1	total number of different parts in a dolly	Measuring gauge or rod for each part ,it reduces counting burden
2	distance between the store to point of uses (controllable factor)	Shifting the storage racks towards line taking care of conjection
3	total number of dollies in a particular section	Increasing the no of dollies in a section to promote better transfer
4	time required to load the dollies in store(controllable factor)	Grouping of all parts , color codes for each dolly, applying mathematics of Chorokyo system
5	takt time	Master piece in every dolly removes the part identification difficulty.

## **II. CONCLUSIONS**

This review literature project emphasis on following things:

-set up time saving modifications and simple purchasing procedure plays imp role in cost reduction hence, proper Kaizen needs to be established.

-to eliminate the Improper Kanban Handling problem one should: incorporate optimum number of kanbans, promptly circulate empty bins, time to time training or awareness program regarding Kanban.

-ABC analysis and its implementation and proper waste and rejection accounting systems helps to reduce part shortage and overflow of parts.

-minimization of controllable factors reduces transfer batch .Improvement in the layout as well as storage system is required to achieve this minimization

**ESPECIALLY, INDIAN INDUSTRIES NEED TO TRANSFORM ITS OPERATIONS RADICALLY OR IT WILL LOSE ITS COMPETITIVE EDGE IN THE GLOBAL MARKET.**

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