

# Application of Continuous Improvement Process in Manufacturing Industry

Edwin Joy Pulikkottil<sup>1</sup>, Sibinraj R<sup>2</sup>

<sup>1,2</sup>PG Scholar, Dept. of Mechanical Engineering, ECET Coimbatore, India

\*\*\*

**Abstract** - KAIZEN, a Japanese management concept that calls for continuous improvement, has been introduced in manufacturing industries through increase their productivity and quality of product and services as a crucial part to secure and success in the future. Organizations are needed to continuously identify new opportunity to obtain competitive advantages. Therefore, a proper continuous improvement (kaizen) is needed to eliminate waste and value added in production to remain competitiveness, retained the potential customer and encourage worker purpose and accountability. Its core to lean manufacturing or Toyota way. its carried out of estimation of kaizen ideas taking into account practicality and efficiency of the idea, direct influence of it on safety, quality, cost and time as well as creativity and personal involvement of employee, which can be used as an improvement tool in every organization estimating every improving activity.

**Key Words:** Continuous improvement, kaizen idea, 5s kaizen, lean manufacturing.

## 1. INTRODUCTION

In order to meet real world of competitive situations like producing products at lowest cost. A continual improvement process, also often called a continuous improvement process (abbreviated as CIP or CP), is an ongoing effort to improve products, services, or processes. This effort can seek incremental improvement overtime, Delivery (customer valued) process are constantly evaluated and improved of their light of their efficiency, effectiveness and flexibility.

### 1.1 Kaizen

The continuous improvement main process are kaizen, 5s, PDSA cycle, Lean, Kanban, Value stream mapping, Standard work, DMAIC, Catch ball, Gemba walks, Hoshin kanri and Juran's trilogy. It's all based on similar principles and forms a key part of both of those practices. Continuous improvement is largely practiced using two disciplines; incremental and breakthrough improvements. The way of working enables efficient workflows that save time and money, allowing you to reduce wasted time and effort.

Nowadays companies around the world face new challenges day by day; globalization has increased competition among them and eliminates. Kaizen is a compound of two Japanese words that together translate as "good change" or

"improvement" through its association with lean methodology.

The quality circles or groups of workers focused on preventing defects at Toyota and were developed partly in response to American management

### 1.2 Lean tools

Lean tools and techniques for minimizing product cost eliminate waste, and reducing delivery time. Lean-kaizen means removal of non value added (VA) activities (wastes) by adopting small improvements. Its needed to identify opportunity in order to reduce wastes and improve overall performance. it can be applied to any area of business, and even to personal life. kaizen can use a number of approaches and tools, such as value stream mapping, which document, analyse and improves information or material flows required to produce a product or service, and total quality management (TQM), the successful use of Kaizen rests on gaining support for approach across the organization, and from the CEO down.

A continual improvement process, also often called a continuous improvement process (abbreviated as CIP or CP), is an ongoing effort to improve products, services, or processes. This effort can seek incremental improvement overtime, Delivery (customer valued) process are constantly evaluated and improved of their light of their efficiency, effectiveness and flexibility. Some see CIPs as a meta-process for most management systems (such as business process management, quality management, project management and program management. Feedback from the process and customer were evaluated against organizational goals. its focused on increasing the effectiveness and efficiency of an organization to fulfil its policy and objectives.

The continuous improvement process to make sure that your process, methods, and practices are as efficient, accurate, and effective possible. This is done by periodically examining and improving your process to smash bottlenecks, use the best software, and take advantages of the most efficient methods.

The continuous improvement main process are kaizen, 5s, PDSA cycle, Lean, Kanban, Value stream mapping, Standard work, DMAIC, Catch ball, Gemba walks, Hoshin kanri and Juran's trilogy. It's all based on similar principles

and forms a key part of both of those practices. Continuous improvement is largely practiced using two disciplines; incremental and breakthrough improvements. The way of working enables efficient workflows that save time and money, allowing you to reduce wasted time and effort.

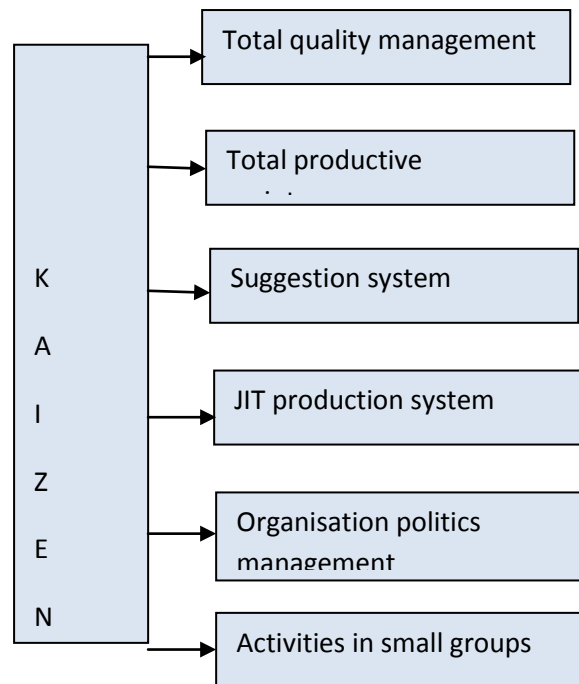


Fig -1: kaizen system

## 2. SOME TECHNIQUES RELATED WITH KAIZEN

Fibrous There are some techniques of kaizen that have been widely used in the industry.

Poka-Yoke (error proof) – system of means eliminating defects being the results of inaccuracy; poka-yoke solutions find application in stable processes and enable to drop of frequency of defects for six sigma level.

Mistake-proofing systems, It is a tool that is ,prevention of quality problems Inexpensive Point of Origin-Does not rely on operators catching mistakes, This tool can be applied to any,Quick feedback 100% of the time.inspection' process, be it in manufacturing or the service industry.

5 'S' concept Seiri-(selection): proper (suitable) preparation of a workplace, manner and instrument of work; with the elimination of everything useless, seito-order (systemic): tidiness in a workplace and preparation of every required tools in the manner enabling simple and quickly utilization,

Seiso-clearness (cleaning): order in a workplace allowing on increase of safety of workplace, control of equipment and responsibility for the means of production

Seiketsu-consolidation (standardisation): reminding employees about their duties in the aspect of care of used tools and equipment and about keeping the workplace order,

Shitsuke-discipline (self-discipline): adaptation of employees to the principles accepted by the organization, independent elimination of bad custom, training.

7 kind of productive loss (Muda) – everything, which does not bring value added; according to the basic classification of the productive loss one can differentiate losses resulting from: excessive inventories, over-production, waiting for next operation (raw materials, employee), transport, inappropriate way of processing, unnecessary un ergonomic motion, internal and external incompatibilities.

7 instruments of the quality control – practical methods of registration and analyses of data; the most popular are: check list, Pareto diagram, reasons and results diagram (so called Ishikawa diagram), histogram, scheme, punctual diagram, check card most often with X-R diagram.

Andon – signal used to show the place in the process requiring additional attention; signal is given by the employee the defect has been noticed.

PDCA cycle – cycle of continuous improvement; plan - do - check – act

## 3. IMPLEMENTATION OF KAIZEN

In order to implement the kaizen we should follow the standard methodology of kaizen. This standard methodology of kaizen can be implemented in various fields. Today, used to improve various kinds of processes that are involved in engineering, manufacturing, management and other supporting processes in the business. This is also known as Deming's cycle, shechart cycle or PDCA cycle. Before implementation of the kaizen methodology, we should take care of process where it is going to be implemented so following points are to be take care:

- Create appropriate goals for the team.
- Ensure that relevant area personnel are informed of the Kaizen plans.
- Ensure availability of relevant area personnel for participation on the Kaizen team.
- Provide a suitable working area.
- Ensure timely review and approval of the Kaizen team's recommendations.

Within the present economical context, considering the importance of revenues, the management focus has been transferred from the sale departments to the After Sales department and cost reduction specific to this activity has become one of the tactic objectives of the organization. The implementation of the concept of continuous Improvement involves.

- Continuous improvement of products and processes;
- Periodical evaluation of the performance standards of excellence criteria previously set in order to
- Identify the areas which need improvements;
- Continuous improvement of productivity, effectiveness and efficiency of all processes in the organization;
- Promotion of prevention-based activities
- Education and instruction of each employee in order to be able to use the techniques of continuous Improvement, such as:
- The Deming cycle – P.D.C.A.
- The techniques and instruments of quality Management;
- Process reengineering;
- Process innovation techniques;
- Setting the objectives concerning improvement and the necessary measures to achieve them;
- Recognition of the results obtained by the Organization staff concerning the continuous Improvement particularly speaking of processes.

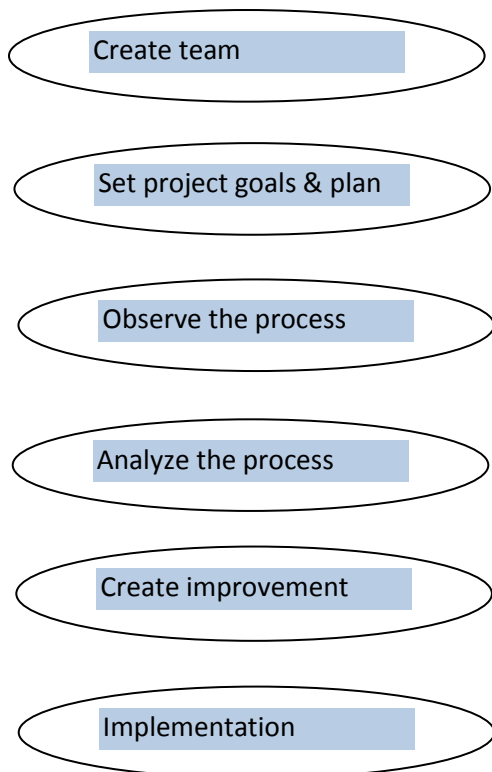


Fig -2: Methodology

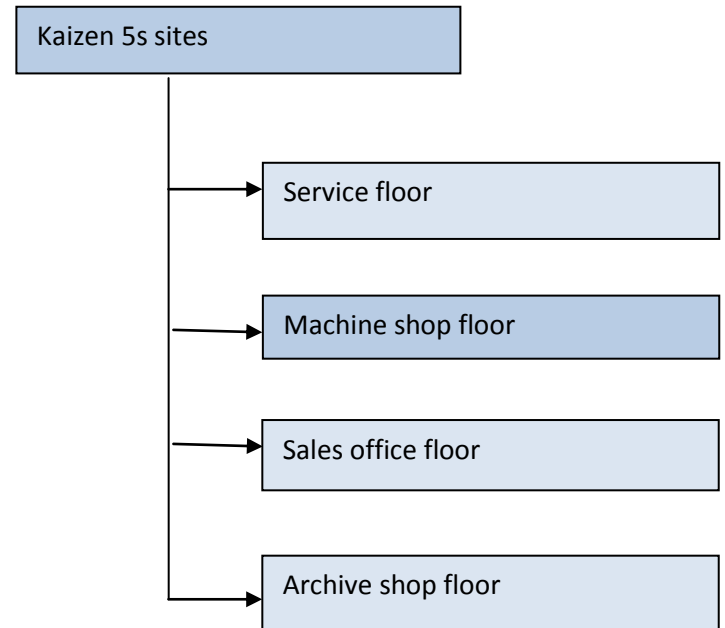


Fig -3: 5s approach

The last period of kaizen implementation is application of the system of submitting a motions concerning the improvement of ideas. Form and procedure of submitting should be clearly defined. Assessment groups can be created on various levels of organizations. Each enterprise should be also obliged to elaborate clear and fair system of estimating the submitted motions. The results of the submitted motions assessment are the basic criterion of employees' work estimation. Results are declared or published in order to enable the whole staff the full insight. Such an approach promotes creation for positive relation between employee and work, high culture and continuous improvement of the achieved results.

#### 4. CHOSEN OF KAIZEN IDEAS

Kaizen idea can be reported by each employee both managers and productive one. However, there are some certain limitations – the idea reported by managers can't be the subject of awards system, and kaizen ideas reported by employees like: administrators, analysts, specialists, engineers, leaders of the groups, coordinators, cannot concern the range of their normal duty. Each kaizen idea should be submitted on specially standardized forms and should cover feature that: Allows for potential improvement of the current workplace or process,

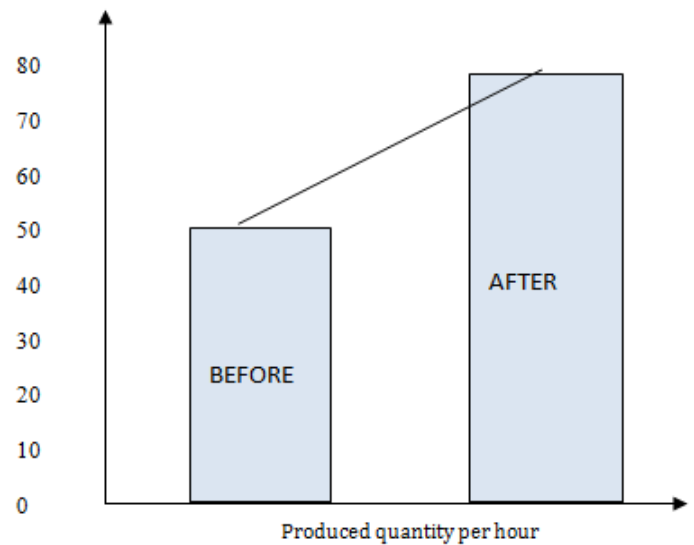
1. Indicates practical manner of its realization,
2. Can be successfully introduced to usage, Is consistent with the occupational health and safety rules.
3. Estimation of chosen kaizen case includes:
4. Description of chosen area, workplace, process,

5. Reporting kaizen idea taking into consideration:
6. Title of the idea, description of the idea

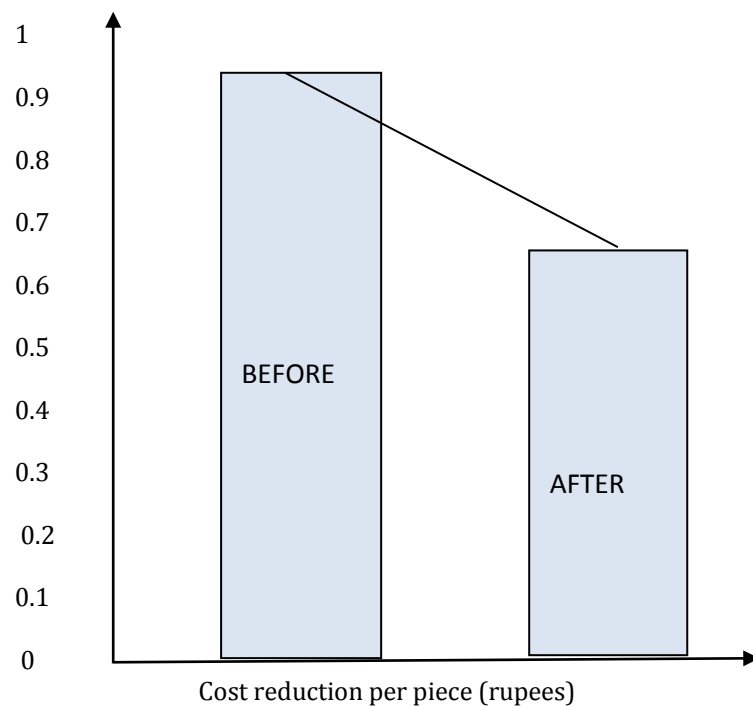
**Table -1:** Description of KAIZEN ideas

INNOVATION	KAIZEN
Creativity	Ability to adaption
Individualism	Team work
Attaching great value to general matters	Attaching great value to detail
Orientation towards techniques	Orientation towards human
Orientation to the individual section	Orientation to the interdepartmental
Searching for the new technology	Basing on existing technologies
limited feedback	strong feedback
short-time effect	long-time effect
participation of several chosen leaders	participation of every worker
adaptation to the fast growth rate economy	adaptation to the slow growth rate economy
Big investment needed	small investment needed

CI (continuous Improvement) techniques are the recognized way of making significant reduction to production costs. Quality Function Deployment (QFD) is a well-known technique for translating customer requirements for a product into functional specification. Data suggests that the best opportunity for significant reduction in the overall cost of manufacturing a product is at the design stage of the new product development program.. These variables include attitude toward Kaizen events, skills gained from event participation, understanding the need for Kaizen, impact of these events on employee. This study provides a wider view of different practical approach of lean manufacturing and thus can help researchers and practitioners to compare their KE performance.



**Fig -4:** Before and after producing quantity per hours



**Fig -3:** Before and after cost pieces

A well-established cost-based theoretical framework can also be developed for a wide range of manufacturing industries for getting benefits in product, process, and services. In order to achieve significant lean benefits, it is important to understand the whole system of any organization. In this Study, an effort has been made to apply Lean-Kaizen concept.

## 5. CONCLUSIONS

The work done in the KAIZEN principles presumes a practical approach and low costs of improvement. The Kaizen management system is based on the continuous loss reduction by means of methods that do not rely on investments, but on the improvement of the processes and the employee's performance. According to the Kaizen principles, we must be sure that, when we take an action, our action will go on in the best possible way and is not merely an intermediate action to generate a temporary result.

The directly productive staff is particularly encouraged so that they can suggest and make improvements. After a detailed analysis, we have noticed that, even in the areas where we consider no improvements are needed; there are still plenty of possibilities to improve. A good management of human resources in the organization is one of the strategic objectives of the organization which should be clearly defined and accepted by all its members. The Kaizen principles are the resistance structure that should be built on, so that we can get to a continuous, step by step improvement of the company performance.

## REFERENCES

- [1] Chen J C, Dugger J and Hammer B (2000), –A Kaizen Based Approach for Cellular Manufacturing Design: A Case Study||, The Journal of Technology Studies, Vol. 27, No. 2, pp. 19-27.
- [2] Dean M and Robinson A (1991), –America's Most Successful Export to Japan: Continuous Improvement Programs||, Sloan Management Review, Vol. 3, p. 67.
- [3] M. Musztyfaga, B. Skořud, Human resources management in a project type tasks, Journal of Achievements in Materials and Manufacturing Engineering 25/2 (2007) 95-98.

## BIOGRAPHIES



Edwin Joy Pulikkottil completed B.Tech in Mechanical Engineering under Calicut University at Jyothi Engineering College. He had 1 year of experience in industry and 2 years of experience in teaching. He is doing Masters in Manufacturing Engineering.



Sibiraj R completed his B.E. Mechanical engineering under Anna University. He had 1 year of experience in industry. He is currently doing Masters in Manufacturing Engineering.