



A Review: Implementation of KAIZEN

Akshay S. Nalawade, Tejas S. Patil, Shubham V. Sutrave, Shivam M. Dixit, Prof. Tushar Patil
Department of Mechanical Engineering, SKNSITS, Lonavala

Abstract — To survive in a demanding market, and still be successful, it is necessary to achieve the high level of the products quality. The main objective of manufacturing industries today is to increase productivity through system simplification and step by step improvements by using modern available techniques. One of the most recognized technique is Kaizen. The Kaizen management originated in the best Japanese management practices and is dedicated to the improvement of productivity, efficiency, quality and, in general, of business excellence. The KAIZEN methods are internationally known for continuous improvement, through small steps, of the economical results of companies. Kaizen is short term, cost effective and result oriented technology which helps to diagnose the root causes of inefficient working and offers a systematic approach. This paper discusses literatures that have been published in this field and presents a review.

Index Terms— Kaizen, PDCA, Poka-Yoke, 5S, 7QC Tools.

I. INTRODUCTION

“Experience is the toughest teacher because first you take the test and second you are taught the lesson.” – Vernon Sanders Law.

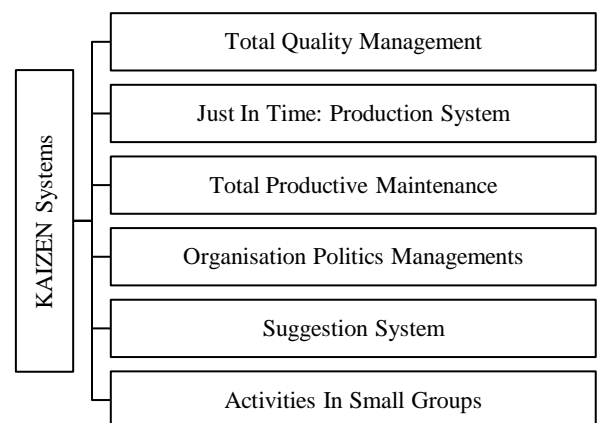
In the decade of 1980, management techniques focusing on involvement of employee and its empowerment through teamwork approach and interactive communications and on improving job design were not new, but Japanese companies implemented such techniques with ease and accuracy than others. The business lesson in that era was that Japanese firms, in their quest for global competitiveness, demonstrated a greater philosophy of continuous improvement than Western companies did. For such a philosophy the Japanese used the term Kaizen.

All over the world the Kaizen techniques have been particularly distinguished as the best methods of improvement within companies since the cost of applying it was minimal. Kaizen means improvement, continuous improvement which includes everyone in the organization encompassing top management, managers, supervisors and workers. In Japan, the concept of Kaizen is engrained to large depth in the minds of both managers and workers that they often do not even understand that they are thinking Kaizen as a customer-driven strategy for improvement. This philosophy assumes that ‘our way of life – which comprises of our working life, social life or our home life – deserves to be constantly improved’. Improvement begins with a fact that every organization has problems, which provide opportunities for change. It evolves around continuous improvement involving everyone in the

organization and largely depends on cross-functional teams

Fig. 1: KAIZEN Systems

that can be empowered to challenge the status qua. Kaizen is short term, cost effective and result oriented tech., which helps to diagnose the root causes of inefficient working and offers a systematic approach to change the attitude of people leading to miraculous organizational change.



The Kaizen methods and techniques [Fig. 1] are valuable instruments which can be used for productivity improvement, for obtaining the competitive advantage and to rise the overall business performance on a tough competitive market.

Radharamanan et al. (1996) apply Kaizen technique to a small sized custom-made furniture industry. The various

problems identified through brainstorming process are absence of proper methodology to ensure quality, lesser compatibility of the individual protection equipment, old machines, and disorganized workplace, improper and insufficient number of measuring precise instruments, lack of training, and insufficient illumination at some locations and adverse quality of raw material. Suggestions are also given to solve these problems. The main aim is to development of higher quality products having lower cost and higher productivity rates to meet customer requirements. [2]

Malik et al. (2007) conducted a survey by a comparative analysis amongst two Asian developing countries, China and Pakistan, by checking how they are deteriorating CI practices. The questionnaire consists of 18 selected blocks of questions of organization and operation oriented, supporting tools used in the improvement activities their effects, company background and its characteristics. The result shows that the industries in both of the countries are refraining CI methodologies in different proportions. [3]

Doolen et al. (2003) describe the variables that are used to calculate the Kaizen impact on human resource. These variables include attitude toward Kaizen activities, talents gained from participation in various events, understanding the need for Kaizen, impact of these events on employee, impact of these events on the field work, and the overall impression of the relative successfulness of these events. [4]

The fact is that the way in which we fulfill even the daily tasks today is not the most efficient way to perform. Therefore, we must seek for innovative paths and means of achieving our targets in the easiest manner and, of course, at the lowest costs.

II. SOME TECHNIQUES RELATED WITH KAIZEN

We present few definitions to get more familiar with KAIZEN concept:

- KAI – Change
- ZEN – Better
- KAIZEN – Change for Improvement/ Continuous improvement.
- MUDA – Scrap, loss or the process or activity that is not worthy.
- GEMBA – The actual place for work.
- GEMBUTSU – The actual product.
- JUJITSU – The real facts and data.
- PDCA – The plan-do-check-act cycle
- SDCA – The standardize-do-check-act cycle

THE 5 “WHY?”

The actual cause that can occur or has already occurred by the occurrence of nonconformity must be identified by interrogating five “Why?”.

THE 5 GOLDEN RULES OF THE KAIZEN MANAGEMENT:

1. When a problem first occurs, go to GEMBA.
2. Check Gembutsu – unconformable product
3. Take temporary measure on the spot.

4. Find the main cause (use the five WHY? questions).
5. Standardize to prevent reoccurrence.

THE FIVE STEPS OF GOOD MAINTENANCE– 5S:

In Japanese, 5s is the short form of five words that presents the idea of proper maintenance. The definitions and significance of the five words are given below:

1. SEIRI – Sorting – making the difference between necessary and useless things in GEMBA, giving up the useless ones.
2. SEITON – Ordering/Arrangement – the ordering of all the items after SEIRI.
3. SEISO – Cleaning and disturbance detection – the working areas/equipment will be clean.
4. SEIKETSU - Standardizing– the extension of the cleaning concept to every individual along with the continuous practice of the three steps 3S.
5. SHITSUKE – Disciplining – By disciplining individuals and getting involved in the 5S actions through standard application.

COMMON WAYS OF HAMPERING 5S:

It has been generally observed that, at the moment the organization decides to implement the Kaizen ideas, the individual shows non willingness to change and the most frequent motivations will be the following:

- What is so special about sorting and arranging?
- Why should we clean since it gets dirty again?
- Sorting and arranging will not improve and alter the results.
- Order and cleaning has been implemented already.
- We applied 5S years ago.
- We are too busy to deal with 5S actions.

POKA YOKE

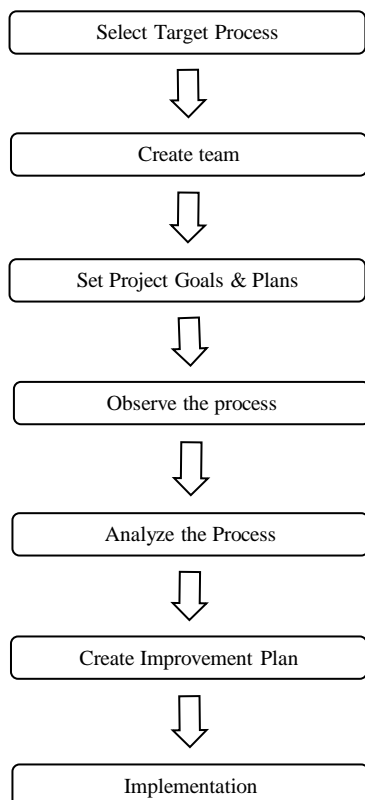
Poka yoke is a Japanese improvement strategy for mistake proofing to prevent mistakes (Mudas) from arising during production process. It is a preventive action that focuses on product identifying and discarding the special causes of alteration in production processes, which inevitability lead to product nonconformities or defects. Earlier this concept was called Idiot Proofing or fool proofing but it was understood that this name may hurt the workers so term “Mistake proofing” was stated by Shigeo Shingo. Poka Yoke gives a strategy and policy for preventing the defects at the core. These ways are not only cost effective but also easy to understand and apply. It is one of the significant options to add to any organization’s Continuous Improvement. In short Poka Yoke is a Continual Improvement Strategy that offers a way to move the QMS (Quality Management System) towards a higher level of performance. This concept was stated in the middle of 1960s by Shigeo Shingo, a Japanese industrial engineer. Shingo was working for Toyota and other Japanese industries, where he built entire production systems focused on achieving zero defects in production and invented this revolutionary work. The simple concept of Poka Yoke is that it is not acceptable and allowed to produce even a minute amount of nonconforming items. To stay in market and to

become a world class competitor, and organization must go with new philosophy and along with side by side practice of producing zero defects. This methods are very easy and simple concepts for achieving this goal and are a key component of Continual Improvement Strategy in many leading Japanese companies at this moment. This is one of the presentations of “Good Kaizen”, or superior continuous improvement because of its preventive nature. A Poka Yoke device or solution is any mechanism or idea that either avoids the mistake from being made or makes the mistake easily found in a jiffy. The ability to find mistakes at a glance is important because, as Shingo states, “The causes of defects lie in worker errors, and defects are the result of those errors. It follows that mistake will not turn into defects if worker errors are discovered and eliminated beforehand.” He adds to this that “Defects arise because error are made; the two have a cause-and-effect relationship. Yet errors will not turn into defects if feedback and action take place at error stage.”

7 DEADLY WASTES (MUDA):

1. Excess production – Production more than production schedule
2. Inventory – Too much material available for processing hides problems
3. Defects – Resources and labor are wasted; capacity is lost at bottleneck
4. Motion – Walking to get parts because of space taken by high WIP
5. Processing – Protecting parts for transport to another processing
6. Waiting – Operator attention time
7. Transportation – Long moves; re-stacking; pick up/put down

7 QUALITY CONTROL TOOLS:



These are the practical methods of registration and analyses of data. The most popular methods used are- Check list, Pareto diagram, Cause and Effect diagram (so called Ishikawa diagram), Histogram, Scatter diagram, Flow Chart, Control Chart.

III. IMPLEMENTATION OF KAIZEN

To implement the Kaizen we should follow the standard methodology of Kaizen. It can be used to improve various kinds of processes that are involved in engineering, manufacturing, management and other supporting processes in industry or business.

Before implementation of the Kaizen methodology, we should take care of following points:

- Select the process area where KAIZEN will be implemented.
- Set the team goal.
- Ensure that respective area individuals are made aware of the KAIZEN plans.
- Ensure availability of relevant area personnel for participation in KAIZEN team.
- Provide suitable working area.
- Ensure timely review and approval of the KAIZEN team’s suggestion.
- Ensure time to time application of approved recommendations.

To implement the Kaizen approach, what we need is a rapid team that has been consistent with the use of the lean systems. Typically, the people in this group will have to undergo some training. When implemented correctly, Kaizen will not only enable us to humanize the workplace but also eliminate all the processes that require more work from our employees which can be about mental and physical activities.

III (A). Process Study:

Within the present economical content, considering the importance of revenues, this activity has become one of the major problem of the organization. The implementation of the concept of continuous improvement involves:

1. Kaizen of product and process.
2. Periodical evaluation of performance of area which is to be improved.
3. Continuous improvement of effectiveness and efficiency of all processes.
4. Promotion of prevention based activity.
5. Training of employee in order to be able to use techniques of continuous improvement.
6. Setting the objectives and necessary measure to achieve them.
7. Recognition of results.

III (B). Research Hypothesis:

The tools used to analyze the data mainly includes seven quality control tools. These different tools provide different type of analysis of data. e.g. Ishikawa diagram (Fig. 3)

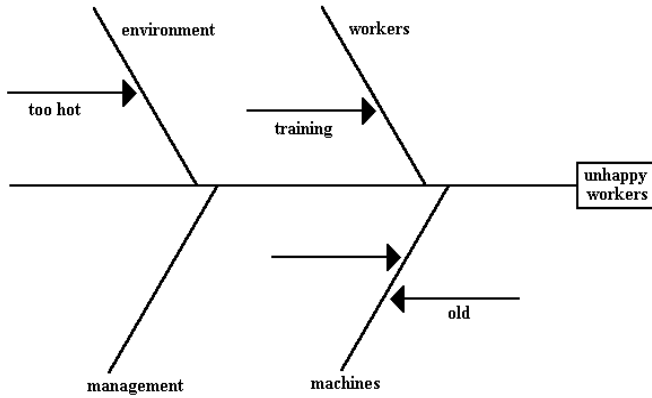


Fig. 3: Ishikawa Diagram

Fig. 2: Implementation c...

presents factors causing problems for particular process.

III (C). Data Interpretation:

After the examination of process and analysis of data the following PDCA cycle or Deming’s Cycle of implementing 5S was identify. (Fig.4)

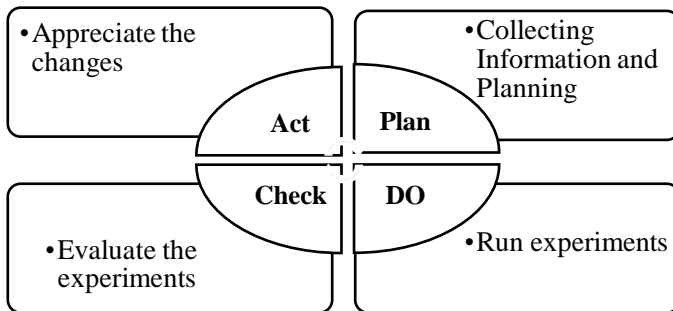


Fig. 4: PDCA Cycle

We are talking about a never-ending process of improving quality not only of the product, technological process but of the entire system company and the cycle has to follow a process approach. 5S is a whole a culture which increases production, improves quality, reduces cost, makes delivery on time, improves safety and improves morale. The primary objective of 5S is to create a clean, orderly environment- an environment where there is a place for everything and everything is in its place. Beyond this, many companies begin their lean transformation with 5S because it exposes some of the most visible examples of waste. It also helps establish the framework and discipline required to successfully pursue other continuous improvement initiatives.

IV. CONCLUSIONS

A primary cause of waste is simply lack the knowledge to employees to do their jobs efficiently and effectively.

After pre-production phase, search for new processes for cost reduction and cost management in manufacturing phase.

Cost reduction in manufacturing can be achieved by

1. New manufacturing tech and development.
2. Increasing m/c performance.
3. Increasing employee’s performance.

Necessary to search all possibilities for cost reduction in every department. (Design, marketing, manufacturing, tech, admin and logistics). Very good instrument for this step is value analysis and value engineering.

The problems encountered during the current activities allow continuous improvement of the results:

1. Reduce consumption and costs increase productivity;
2. Reduce delivery time,
3. Increase flexibility in meeting customer requirements, etc. all these improvements with the effect of increasing competitiveness.

It is easier and faster to train employees in a work area.

Way to measure 5S benefits in the workplace is to take pictures. Pictures are very effective at the visual impact and present the feedback of 5S implementation.

5S is one of the most widely adopted techniques from the lean manufacturing toolbox.

5S is considered a foundational concept, as it establishes the operational stability required for making and sustaining continuous improvements in a company.

Primary objective of 5S is place for everything and everything is at its place.

It also helps establish the framework and discipline required to successfully pursuing other continuous improvement initiatives for the company.

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