

KAIZEN – A Methodology to Boost Productivity in the Era of Make in India

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Abstract— The Kaizen management is improving the process step by step continually, and it affects productivity, efficiency, quality. The Kaizen method acknowledged as method of improvements applied to key processes will improve the major of company's operating cost, build a way to obtain the clients loyalty and adherence. Kaizen represent the small incremental improvement steps towards the journey of continual improvement of an organization. The paper presents in a concrete way a study regarding the application of these concepts in a real organization which builds its business success on the phenomenon called knowledge.

Key words: Kaizen management, Plan Do Check Act (PCDA), GDP

The 10 steps are the process map through which the kaizen event is being effectively implemented for process improvements:

- 1) Define the problem
- 2) Document the current situation
- 3) Visualize the ideal situation
- 4) Define measurement targets
- 5) Brainstorm solutions to the problem
- 6) Develop Kaizen plan
- 7) Implement plan
- 8) Measure, record and compare results to targets
- 9) Prepare summary documents
- 10) Document action plans to sustain the improvements.

I. INTRODUCTION

Prime Minister Narendra Modi on 25 September 2014 initiated Make in India to encourage companies to manufacture their products in India. The major objective behind the initiative is to focus on 25 sectors of the economy for job creation and skill improvement. Few select sectors are: automobiles, chemicals, IT, pharmaceuticals, textiles, tourism and hospitality, auto components, renewable energy, mining, bio-technology, and electronics. The initiative hopes to increase GDP growth and tax revenue. The ambition also intent towards high quality standards. The initiative hopes to improve the capability of manufacturing sector in India and in turn attract capital and technological investment.

Kaizen refers to activities that continually improve all functions and involve all employees from senior management to the workers and staff. And thus with the dream initiative of "Make in India" with aim of high quality standards, the quality improvement Kaizen is going to play a vital role in time to come in all business functions including manufacturing sector, service sector and back end office and operations process also.

Kaizen methodology can be applied to all processes, such as purchasing and logistics, supply chain, maintenance. It has been applied in healthcare, psychotherapy, government, banking, and other industries. Rani et al (2015) studied the use of kaizen in material handling system. Bhat et al (2007) have done similar study in improving the fuel economy of vehicles.. Koide et al (2007) studied the kaizen improvement process adopted to vehicle order delivery process, to reduce the lead time, with minimum inventory in operation. kaizen usually delivers small improvements, the culture small improvements and standardization cumulate to large results in terms of overall improvement in productivity.

II. KAIZEN PROCESS IMPLEMENTATION PLAN

Kaizen process improvement methodology can be molded from famous Deming Cycle Plan Do Check Act (PCDA).

III. CASE OF A METAL PRODUCTION IN INDIA

The company is in business of production of metal sheets through electrolysis method. The process of manufacturing is by keeping the continuous flow of metal solution (electrolyte) across the series of cells. Each cell is filled with electrodes (lead anode and aluminum cathode). Electric current is allowed to pass though the electrolyte, which dissociates metal solution into ions. After dissociation, metal ion gets deposited to cathode. The deposition cycle time is 24 hours, after each deposition cycle of 24 hours, the cathodes are taken out from the solution and deposited metal sheet is stripped out to collect the metal sheet and weighed to calculate the daily production. After stripping process, the cathode sheets are put back into the cell for fresh deposition. Once the entire cathodes are stripped, the operator requires checking the cathode and anode positions to ensure that all are placed with proper gap. The weight of metal collected for the day a and electricity consumed for the day is used to calculate the energy efficiency and electric current density per metric ton of metal produced. The company has two numbers of identical production lines. It was observed that the average daily production of both lines is not consistent and the variation is very high. The designed capacity of production was 600 kg/ day but the actual average production was around 500 kg/day and standard deviation 50 kgs. To resolve this issue, kaizen methodology has been used to take improvement initiatives for improving the daily production and bring consistency too.

To initiate the kaizen the process map of the entire production system mapped out. Technical requirements checked with actual operating parameters and found in order. Thus, it become clear that the issues is not on technical side, rather is could be on process operation and practices. The operating team for each line was fixed and working for a long time. To dig in further, both teams were observed and even their working recorded to compare the operation practices, along with this, brainstorming session with operating staff carried out and all the variables that can

affect the production are listed down. Few of them are as under

- Poor anode conditions in cells.
- At many cathodes, copper tip used to make connectivity with main electric feeder is found deposited with salt.

To resolve the issues, small best very effective improvement actions identified and implemented. The details of the actions take are as under

A. Issue 1:

Poor Anode Conditions in cells

1) Cause Identified:

- 1) The cathodes are taken out daily for stripping purpose, but the lead anode remain inside the electrolyte solution, a thick layer of salt get deposited on it, which needs to be removed on regular basis. The current cycle of anode cleaning is 30 days.
- 2) Hammer is used to remove the salt from the anodes.

2) Action Taken:

- 1) Anode cleaning cycle reduced to 25 days instead of 30 days to allow the less amount of deposition over anode.
- 2) Use of hammer stopped and light weight cleaning knife (Khurpi) is introduced to clean the anode.
- 3) Method of cleaning anode documented as standard operating procedure.



Fig. 1: (a) with Hammer



Fig. 1: (b) With Knife

B. Issue 2:

Cathode copper tips are not clean

1) Cause Identified:

Operators do not have standing instructions to clean the copper tips after stripping the cathode.

2) Action Taken:

- 1) Process of weekly cleaning of cathode tips made and operators trained and instructed to follow it.

- 2) Method of cleaning of cathode tip documented as standard operating procedure.



Fig. 2: Weekly Cleaning of Cathode Tip

IV. CONCLUSION

The small process improvements (Kaizen) help in achieving better productivity. These improvement projects are easy to implement and results are visible. They also help in building a moral boost and team cohesiveness, as operating team visualize their contribution in process improvement. As we are looking forward for Make in India with improved quality, Kaizen methodology is surely going to help all manufacturing as well service sector to improve their process efficiencies with work team involvement.

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