



Kaizen event applied to aluminum manufacturing – Case study

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ABSTRACT

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It is evident that Kaizen event adoption by both the private and public organizations elicits a wide range of positive ramifications. This is particularly in the pursuit of realization of different goals and objectives in private and public organizations. This paper explains and demonstrates how kaizen event is utilized as the powerful tool for performance enhancement through the rapid change in the targeted area, depends on Lean Manufacturing principles and techniques. Despite the abundant research information on continuous improvement tools & techniques, there is a little information related to the application of kaizen event mainly in aluminum industry due to limited academic efforts implemented for appraising or assessing the implementation of Kaizen Event approach. In this paper, Cathode sealing plant optimization has been identified as a scientific process that utilizes kaizen event to tackle contemporary issues in the plant. This paper has identified the existence of literature gap in the effectiveness of Kaizen event, particularly in the manufacturing sector. The findings in this paper has recognized that a stepwise implementation of Kaizen event leads to a reduction of rejection rates, increase in daily cathode production and maximizing the plant availability for the sake of successful & desired process.

Keywords:

Kaizen event, lean management, continuous improvement, ideas generation

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1. Introduction

Kaizen events are identified as short duration improvement projects with a particular focus on development. The process typically takes one week through guidance from a facilitator. Kaizen event is a pillar placed under lean manufacturing practices which requires total employee involvement to run the event for the purpose of gaining set targets. In this case, the implementation team is predominantly members of the section where the Kaizen event is implemented with a few more participants coming from the support and Maintenance. A review noted by Arya [1] that the Kaizen event is comprised of 3 distinct steps which include systematic orientation system, consistent

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improvement and standards maintenance. The existence of Kaizen Event concept can ideally guide in the process of ensuring a proper cathode sealing plant optimization. The benefits include reduction of rejection rate, the increment of daily cathode production and maximization of the plant availability. This research paper provides a Kaizen Event analysis that can be used in process optimization of cathode sealing plant and any manufacturing plant.

2. Kaizen Event

2.1 Kaizen Event Importance

Kaizen is a Japanese word meaning change for the better and later on in western part called continuous improvement [1]. The effectiveness of Kaizen Event in the process optimization of cathode sealing plant is hedged on the schedule of the process. The schedule includes problem definition, Kaizen Logistics, ideas generation, testing, and implementation [2]. A research study by Manuel [3] revealed that the economic improvements are changes accomplished through improvement of fitness between the demands of work tasks and the capabilities of their workers. In light of this, it will be up to the participants of the Kaizen event to come up with clearly informed choices tandem to improvements fitting appropriately and best practice for particular tasks. The consistent improvement in product quality and productivity ought to be singly realized by approaches of systematic analyses and optimization of the overall industrial production processes. The Kaizen event implementation would lead to the identification of process goals, a measure of the different organization outcomes appropriately and collecting new improvements suggestions [3].

2.2 Background on Kaizen Events

One of the most appreciated resources that can make extraordinary results is the employees of the organization. They can make the difference between successful organizations from less successful organizations. To properly engage the employees towards continuous improvement culture, it has been necessary to adopt new concepts. Lean Manufacturing has proved to be such a tool for improving overall operational performance of the organization. The basic underlying goal of lean is reduce/eliminate wastes in human efforts, inventory wastes and other forms of wastes [3].

The business case development is the initial main phase, planning phase, to go for kaizen event and the outcome of well-established case. The second main phase includes the team formation by forming a cross-functional team who will initiate project charter. The third main phase in the Kaizen event is vital and dynamic phase as its people oriented focusing on a spot implementation. The operational realm of the Kaizen event implementation is consistently oriented on the need of developing a technique suitable for solving issues and proposing new ideas of improvement incrementally and through a sustained process over time that represents the last principal phase in the event as shown in Figure 1.

From Figure 1, it is worth noting that the most appropriate approach to implementing Kaizen event is through maintaining and improving standards through teams commonly known as Kaizen teams or groups of continuous improvement. In a review provided by Van Aken [4], a comprehensive understanding of the Kaizen events in an all-inclusive different context from the private sector is a representative of an approach aimed at filling the gap in the existing theoretical blank as a best practice in modern organizations. The rationale of this could be attributed to the need of possessing a more accurate improvements expected and enactment of more plausible measures in identifying their ideal levels of performance. In this case, in the event of making considerations on improving efficiencies of the cathode sealing plant, it is necessary to adopt appropriate actions and initiate gathering of data to identify their performance which can be referenced upon once the overall event

is completed. Ultimately, the process will lead to a reduction of rejection rate, the increment of daily cathode production and maximization of the plant availability.

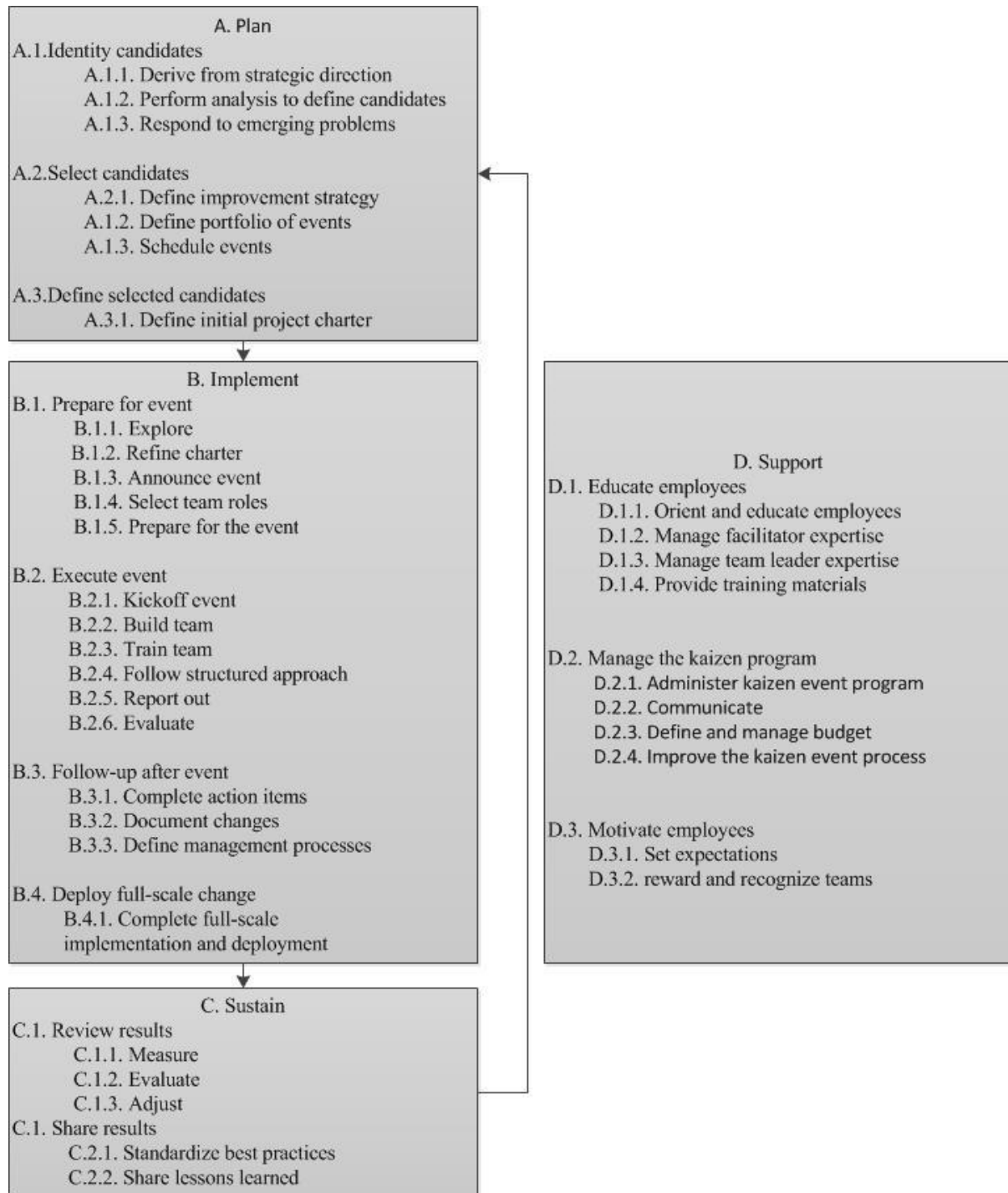


Fig. 1. Kaizen event framework Source: Van Aken *et al.* [4]

2.3 Business Case of Kaizen Event & Schedule

According to a study highlighted by Rashetenko [5], optimization of cathode sealing plant includes sealing aluminum reduction cells in creation and maintenance of hepatic seal which has direct impact on aluminum cell span life. The 4 days kaizen event schedule is depicted in Table 1.

Table 1
Kaizen event schedule

Time	Day 1	Day 2	Day 3	Day 4
8.15-8.30	Business Case Review			
8.30-9.30	Problem Definition	Ideas Generation	Ideas Generation	Ideas Generation
9.30-10.00	Kaizen Logistics	Ideas Testing	Ideas Testing	Ideas Testing
10.00-11.00	Ideas Generation			
11.00-12.00			Ideas Implementation	Ideas Implementation
12.00-1.00	Lunch			
1.00-1.15	Business Case Review			
1.15-2.15	Ideas Generation	Ideas Implementation	Ideas Implementation	Ideas Implementation
3.15-4.00	Ideas Testing	Ideas Testing	Ideas Testing	Ideas Testing
4.00-4.30	Wrap-up			

Unoptimized process can lead to a reduction of the operational efficiency causing the premature removal of the reduction cell. This might result in catastrophic failure of the reduction cell which might lead to electrical damage and risks linked to such failures.

3. Results and Discussion

By the 5th day of Kaizen event, the preliminary results shows that the plant was able to move toward its target by producing 54 cathode blocks per day. The target was to produce from 44 to 56 blocks /day. The rejection rate was 0.7% with the target being from 1.5% to 0.5% and lastly the plant availability was standing at 86% with the target being from 80% to 90%. These results were achieved due to intense focus on ideas generation and implementation. To understand the Kaizen event implications to the cathode sealing plant, it is necessary to evaluate the ideas generated during the 4 days event. It is crucial to specify ideas target and ideas actual during the report out to the management to get team recognized for the hard work in the focused event.

As shown in the Figures 2 and Figure 3, approximately 240 ideas were planned to be raised, 160 to be tested and 110 to be implemented. However, in the actual ideas, 391 ideas were presented, 212 tested and 181 implemented.

In addition, 31 ideas were registered & considered as medium and long term ideas which need 2-24 weeks for implementation. Hence, the trial period was short despite of the need for plant performance to be monitored in its continuous operation.

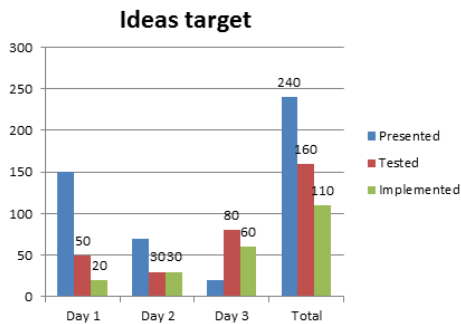


Fig. 2. Target ideas in Kaizen event

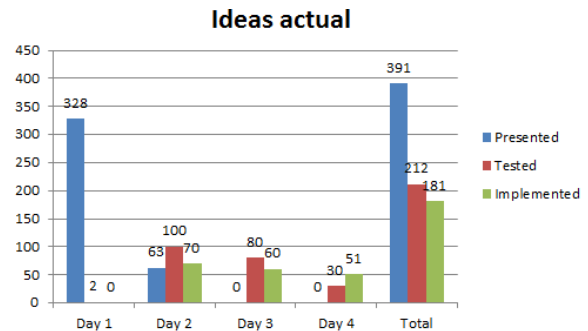


Fig. 3. Actual ideas in Kaizen event

4. Conclusion

This research paper has presented the application of kaizen event in Aluminum industry; cathode sealing plant. A successful implementation of Kaizen event has a substantial various benefits , as is experienced & noticed from the 5th day of kaizen event at optimizing cathode sealing processes ; a reduction of rejection rates (0.7%), an increase in the daily cathode production (54 blocks) and lastly maximization of the plant availability by (86%). Although the most important aspect of this project is that the way it was conducted, managed & controlled allowed the organization to gain remarkable outcomes rely on the super power; employees' creativity & innovation. However, there still exists a limitation on literature on the best practice that can be adopted by different organizations to leverage on methodologies in solving their workplace problems. Consequently, this case study shows how the Kaizen Event is a powerful process for both private and public sector companies.

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