Using The Lean Kaizen Method To Unlock Great Potential

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Abstract

Kaizen (or commonly referred to as Value-Add Kaizen) is a problem solving tool used for process improvement by identifying if an activity (which is part of a process flow) is Value Add (VA) or Non-Value Add (NVA), then take steps to either remove or reduce these NVA activities. As these NVA activities are eliminated, the sequence of the process flow may need to be redesigned to be more efficient. This method can be used to improve throughput, cycle time, cost and reduce any type of waste in the organization.

INTRODUCTION

A good definition of Kaizen (改善), Japanese for "improvement", or "change for the better" refers to philosophy or practices that focus upon continuous improvement of processes in manufacturing, engineering, game development, and business management.

Value-Add Kaizen, (VAK) is a problem solving tool used when designing or improving processes, or part of a process against a specific loss in the organisation.

VAK METHODOLOGY

There are 7 steps for the VAK. They are:

Preparation: Establish the Theme, Team and Project Plan
Step 1: Defining the phenomena
Step 2: Study the system
Step 3: Define the challenge
Step 4: Detailed analysis
Step 5: Solutions and future state development
Step 6: Results
Step 7: Sustaining

We shall use an illustration to go through all the steps in this VAK.

PREPARATION: ESTALISH THE THEME, TEAM AND PROJECT PLAN

We can use the Business KPI data to establish a theme. Often, in a fab environment, the common continuous improvement required is in areas of throughput, cycle time, cost and yield. Once a theme is selected, a "Project Charter" has to have a Sponsoring Manager, who can help provide guidance, secure resources and approval, and link to higher management required for the success of the project.

The scope has to be clearly defined in the project charter, which includes deliverables (target) and time-frame.

Next, the team must have a lead, process owner and various stakeholders. It will also be good to include an independent facilitator to advice on the technique. The roles, responsibilities and deliverables of the team members must be clarified during team formation. As the project may run over several months, approval from the member's manager is required to allocate sufficient time for the project meetings and activities. A draft Master plan should be prepared together during the first few meetings.

Dynamics and stages of Team formation is beyond the scope of this paper.

As a case study for illustration, we selected a recent engagement with a verticaly integrated LED manufacturer. This client engaged MAX to drive cycle time reduction for their new product development process. The development cycle normally takes slightly over 12 months. We set a target of 6 months for the development cycle. Our team consisted of Program Manager, Technical Project Lead, Process Engineers, Manufacturing and Quality engineers. The project took 18 months to complete.

STEP 1: DEFINING THE PHENOMENA

Now we are ready to walk and map out the entire process from the beginning to the end. Nash and Poling (2008) devoted an entire book for the mapping process.

We mapped the process with VSM flow charts (by using the SigmaFlow tool) or alternatively one can list the processes in a table. At this time, we can map the process in at a slightly higher level for a start to look at the big picture. We can always do a "deep dive" at a later stage for further analysis.

After mapping the processes, we need to put in the process time and the waiting time for the activities. Next, for each of the activities, we have to determine if the activity is Value

Add (VA) or Non-Value Add (NVA) to the process. A VA activity changes or adds to the (raw) material to meet customer's expectation. An NVA activity could be redundant transport, take time and space but do not add or change the material to that which meets customer's expectation. This is illustrated in Figure 1.

STEP 2: STUDY THE SYSTEM

Now, we are ready to study the process map for the product flow. We need to verify that the NVA activities identified do not add value and can be removed, if not reduced from the flow. We then review if this flow now is closer to that of an ideal state with minimum or no wastage (time, material, space, etc.).

STEP 3: DEFINE THE CHALLENGE

After removing the NVA activities, we need to establish the real gap in performance and set SMART targets to achieve for the project. SMART targets are acronym for Specific, Measurable, Achievable, Realistic and Time-bounded. If the targets cannot be defined as SMART targets, it project can quickly lose focus and derail.

STEP 4: DETAILED ANALYSIS

We have to study in depth all the NVA activities listed. This means, studying their specific problems and seek their root cause to solve them. One of the methods to find the root cause is the "5-whys". We continue to ask, "Why" until we isolate the "Symptoms" from the "Root" or "Main" reason. We can then use one of the following to mitigate the NVA activities, ECRS: Eliminate, Combine, Reduce or Simplify.

Table 1 lists some of the activities which should be looked into for cycle time reduction in our new Product Development.

STEP 5: SOLUTIONS AND FUTURE STATE DEVELOPMENT

After studying in depth the NVA activities, we can then develop working solution to improve the process flow and implement the solutions on selected pilot or small scale runs. We should also update the new state on the process map and clarify any outstanding issues.

During the pilot or small scale runs, we should observe if this new "solution" is able to achieve the same objective as the old flow, without creating issues (defects, wastage, rejects).

STEP 6: RESULTS

We can now track and record the relevant improvements against the old process flow. We can base that improvement on cycle time reduction, NVA activities reduced or eliminated or problems resolved.

This should translate to tangible savings and VA impact. We can look at dollar savings (manpower, material, space) and cycle time reduction which means reduced WIP in the line.

STEP 7: SUSTAINING

Another term for sustaining is "Holding the gain". This step is essential to ensure that the new process flow is formally replacing the old flow and to organization does not revert back to the old flow.

Documenting the new procedure is important for traceability purpose to record when the old process flow is switched to a new one. This impact will trigger down to other adjacent processes. Documenting is also critical for change control and risk management. Finally, as the team members move on to other responsibilities, the document serves as a training tool and future education reference.

CONCLUSIONS

As in any problem solving tool, Value Add Kaizen will only be effective when this knowledge is put into practice *continuously*, as the name implies. The steps may seem trivial and straight forward but the challenge will be for the team to question convention, solicit support and approval to change what has been practiced in the organization for a long time.

In a successful implementation of Value Add Kaizen, the organization will have real savings in cycle time, material (WIP) and labour which translates to reduced cost.

ACKNOWLEDGEMENTS

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REFERENCES

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ACRONYMS / DEFINITIONS

Kaizen - *en.wikipedia.org/wiki/Kaizen*

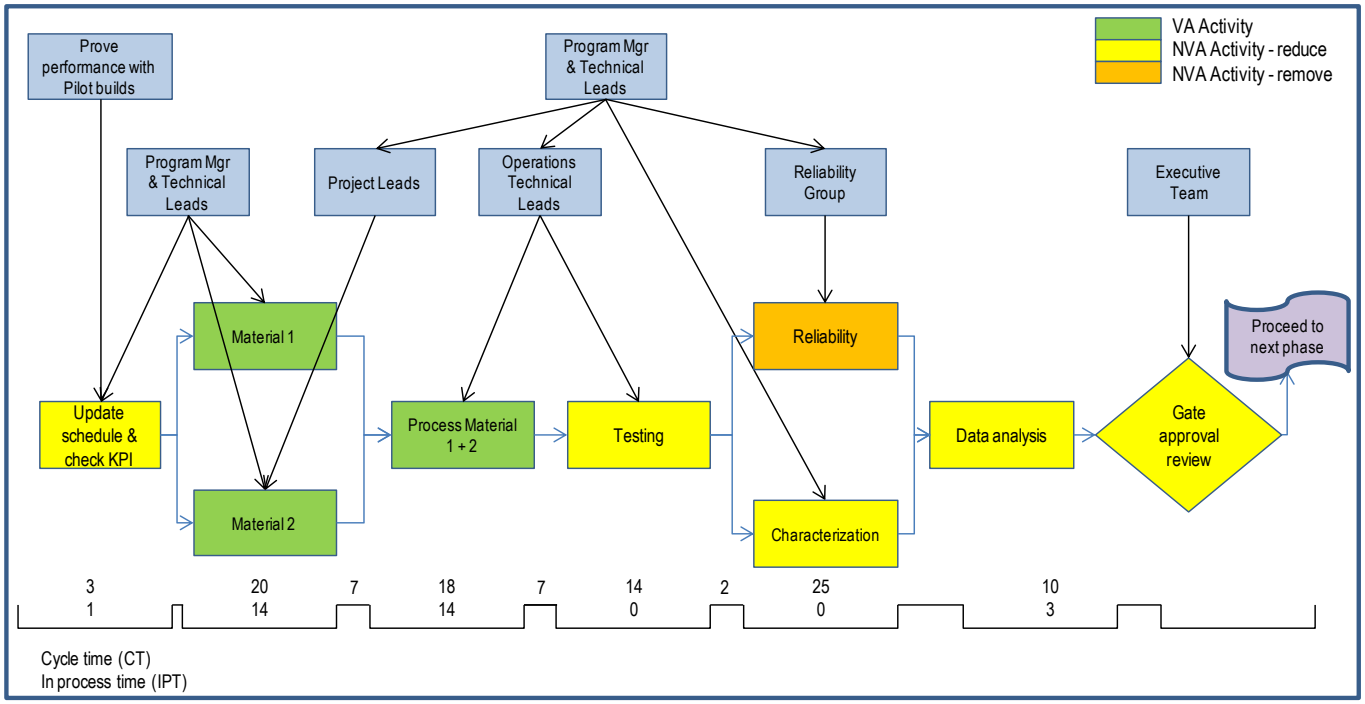

FIGURE 1: MAPPING PROCESS FLOW - SAMPLE

TABLE 1
SUMMARY OF ANALYSIS OF CURRENT VERSUS GOAL AGAINST BENCHMARK AS REFERENCE

Activity	Today C/T (days)	Goal C/T (days)	Benchmark Range (days)	Benchmarking Notes *Based on Semiconductor 3 GaAs (RF ICs) + 2 CMOS (Mixed-Signal IC's) Products*
Prototype Builds	126	53	45-60	Pure Production cycle time <30days typical; most of time is engineering judgment which benchmarks not conclusive
Reliability	95	45	28-45	Most teams do 1000hr testing; Coupled with RMP (Rel Monitor Programs) to cut durations to 500hrs on some initial outputs.
Process Integration Design/Dev.	65	30	?	No relevant benchmarks found; again though engineering time is assumed to be largest contributor – need to assess
Technology Development	42	21	0 or 30+	Most teams do have enabling technology independent of product phasing; though when it is done in parallel during prototype builds can be expected to increase ~50%
Running DOEs	40	20	0-21	Leading practice is to have this run in parallel during prototype builds
Phase Gate Reviews	35	12	0-8	Leading practice is to have materials done as part of work (0 days) and more typical is ~2 days/phase gate review
Supply Chain Management	22	11	8-12	Typical planning work takes 2-3days per phase of development activity