

Lead time reduction and increasing production in winding area using Kaizen and VSM: A Review

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Abstract— Nowadays, life continuous improvement for any organization as well employees performance and their attitude. 'Kaizen' is a continuous improvement process 'kai' means continuous and 'zen' means improvement. By the help of value stream mapping in this we reduce the time and waste also. We study the time and seven wastes.

Keywords—Continuous Improvement/kaizen, Value stream mapping, Waste elimination, reduce motion defect, seven wastes

I. INTRODUCTION

Today's TBEA over-70- year experience in the power transmission industry. It is a backbone enterprise of the ability transmission business within the world and therefore the birthplace of china's electrical device business.

TBEA has ability style, manufacturing, sales and service of oil-immersed high-voltage current transformer, inductive voltage transformer, combination transformer, current transformer with SF6 gas insulation, and capacity voltage transformer. The voltage scope of merchandise is from 35KV up to 765KV. The total annual production capability of merchandise of assorted voltage grades is up to fivehundred sets.

The seven Value streaming tools are represented into the seven wastes:

*Transportation- transport waste is material movement that's circuitously related to a worth adding method.

Process should be as close as possible and material flow directly from process to process.

Caused

poor layout, complex material handling system

*Inventory- unnecessary inventory that accumulates before or after a process is an indication that continuous flow not being achieved.

*Motion- waste motion is any motion of man or equipment that does not value added to the product.

*Waiting- it's any ideal time produced when two interdependent process are not completely.

*Over production- it's worst kind of waste because it causes other wastes and obscures the need for improvement

*Over processing- putting more into the product

is valued by the customer.

*Defects- waste of correction includes extra work performed on a product.

value stream mapping are used to unnecessary motion and ergonomic reduce by using most, time study and etc.

value added and non value added are calculating and then removing the waste.

kaizen is a continuous improvement process in which 'kai' means the continuous 'zen' means the improvement there are many techniques are used to improvement like PDCA plan do check again, 5why are also.

Motion and Time study-

The most generally handled issue is the means by which to enhance proficiency and profitability. Movement and time think about method is one of the profitability enhancement systems utilized in many assembling organizations. Movement and time examine is characterized as a logical investigation technique intended to decide the most ideal approach to execute the dreary undertaking and to quantify the time spent by a normal specialist to finish a given errand in a settled work environment. Movement and time consider offers genuine difficulties in association including capable designers, business overseers, modern relations faculty, particularly prepared chiefs, and analysts

II. LITERATURE REVIEW

This section comprises some of the literatures used for industrial tools using VSM and kaizen

VSM(value stream mapping)

Neha Verma et al (2016) A VSM orders every one of the procedures into esteem including and non-esteem is including ones. A definitive objective of VSM is to distinguish all kinds of waste (non-esteem included) in the esteem stream and to find a way to dispense with them [1].

Jafri Mohd Rohani et al. (2015), Had Production Lead-Time(PLT) was decreased from 8.5 days to 6 days and value added time decreased from 68 min to 37 min[11]

Muruganathan V, Govindara et al(2014) This paper points of interest with the utilization of the VSM in decreasing waste in assembling organization. The creation process way is imagined by mapping the current state esteem stream mapping .After following the whole procedure, wastage influencing the process duration has been recognized and its causes are broke

down. A future state esteem stream mapping is created and enhancement thoughts are proposed. Esteem stream mapping is demonstrated as a valuable system to limit the cycle time and increment the profitability [2].

D.T Matta et al (2013) portray in detail a strategy to structure a coordinated and altered esteem stream outline development businesses necessities. The methodology was produced and confirmed dependent on a synergistic task of connected research. Result point of the examination group is to adjust what's more, actualize the methodological methodology of redone esteem stream plan to other comparative branches [4].

Dario Antonelli et al (2017) VSM analysis allows to identify the management problems due to an excess of non-value added activities and to long [12].

Tomas Rohac et al (2014) Organization is partitioned into three gathering cost, strategic and quality. In this article coordination's process crosswise over entire VSM from way to entryway was broke down. the lead time was 296 days which surpasses expected execution setup by best administration 96 days all the more then multiple times. VSM reveals number of issues and bottleneck in organization coordination's process and 5 enhancements was recommended. Process cost and viability advancement [16].

Benjamin Haefner et al (2014) in this article an imaginative methodology called Quality Value Stream Mapping (QVSM) is introduced. In light of the structure components of VSM, it gives an appropriate instrument to the representation, investigation and plan of value affirmation measures inside process chains in assembling the procedure model consists of four consecutive phases: preparation, quality value stream analysis, quality value stream design and implementation. The method enables the visualization of inspection processes [5].

Adwait Deshkar et al (2018) The current process of the industry and evaluating the same to identify wastes and bottleneck processes. Based on the 7 wastes of lean manufacturing, solutions are suggested to remove the wastes identified. Future state outline reenacted and broke down for various traits, for example, TAKT times, creation lead times, and preparing time to assess the general gain accomplished by utilizing esteem stream mapping. Reenactment results anticipated a decrease in TAKT time from 46 minutes to 26.6 minutes. Number of rolls made every day expanded from 28 to 50. Usage of lean assembling structure expanded the esteem included time by 74.5%. Reproduction results demonstrate that structure perhaps relevant to different other little scale enterprises [6].

Dario Antonellia et al (2017) The VSM investigation prompts enhance the procedure through the decrease of non-value included advances. The streamlining is frequently checked by PC recreation Computer Simulation (CS) before genuine execution in plant. That they could deliver positive results if the objectives are precisely picked and if a few guidelines of utilization are regarded. CS should be combined with VSM not so much for verification as for sake of a different picture of the investigated MS [15].

Satish Tyagi et al (2014) value stream mapping (VSM) strategy is utilized to investigate the squanders, wasteful aspects, non-valued included strides in a solitary, determinable process out of entire item improvement process (PDP). This single step is profoundly intricate and happens once while the PDP goes on for 3-5 years.

Value Stream Mapping based strategy is utilized to create the current state outline request to discover the losses simultaneously and activity intend to kill all the squanders to achieve the future (better) state. With the end goal to build up the current express, a Gemba walk is done with the end goal to locate the most unpredictable and protracted lead-time process focused for development. Subsequently, a meeting to generate new ideas is led to discover the main drivers of squanders. The structure is still in the execution stage, be that as it may, the normal advantages are outlined. All the proposed changes will result in the decrease of lead time for the structure arrange diminishing consequently the general PD lead time by half [13].

KAIZEN.

Cemrenur Topuz et al (2013) The word 'kaizen' signifies 'constant enhancement' in Japanese and it is comprehensively characterized as 'a procedure of enhancement of the standard method for a work [3].

Mohd Ghazali Maaro et al (2015) To execute Kaizen, organizations will receive the Plan-Do-Check-Action (PDCA) cycle to comprehend both unit-useful furthermore, cross-utilitarian issues in their exercises. Amid the arranging stage, workers will endeavor to distinguish territories that require enhancement. When they have distinguished the issue zones, the subsequent stage is to execute the Kaizen. To actualize the Kaizen the workers can utilize different procedures to build up a clearer comprehension of the current squander regions, for example, the Five Whys procedure or Value Stream Mapping (VSM) method [7].

Liuxing Tsao et al (2015) Kaizen" is one of the generation strategy roused by Japan culture which energizes everyone in the processing plant to make enhancements and change the inappropriately generation exercises [8].

A.P. Puvanasvaran et al (2010) The legitimately apparatuses and procedures for example, 5why, Work Instruction Sheet, Pareto chart, Process Mapping, PDCA Cycle what's more, conceptualizing were utilized. The kaizen execution has lessened the level of time misfortunes which is 48.44%. More than that, business arranges handling lead time was decreased about 6.98% and creation lead time lessened about 14.93%. These outcomes have demonstrated the adequacy of kaizen approach Kaizen reasoning grasps three primary standards proposed by which are process introduction, enhancing and keeping up standard and individual's introduction. All standards are noteworthy with the end goal to execute the kaizen [9].

Yuki Higuchia et al (2014) We led a randomized controlled preliminary of here and now administration preparing for little producers in two examination locales in Vietnam and gathered follow-up information over and again for a long time to evaluate longer-term impacts than the current investigations of administration preparing.

Result that the preparation program expanded members' esteem included one of the two investigation destinations, likely in light of the fact that they figured out how to dispense with squanders underway [10].

Miroslava mlkva et al (2016) taken a shot at their standard was improved, there new standard moves toward becoming there gauge for further enhancements, etc. Improved institutionalized work was endless procedure.

Documentation of the present procedure for all movements, decrease in fluctuation, simpler preparing of new administrators, advances critical thinking, and included colleagues in creating poka-burdens[19].

Puutasayan narapinji et al (2016) Dealt with the decrease of waste produced in the earthenware production fabricating process through the execution of the QC Tool comprised of the Check sheet, Graphs, Pareto diagram and Fishbone. The waste created from the Manufacturing procedure diminished by 8.68% [20].

TIME STUY

Jafri Mohd Rohani et al (2015) Three types of times: optimum time (OT), most likely time (MLT), and pessimistic time (PT) were measured to estimate expected time (ET) of each task $ET = (OP + PT + 4MLT) / 6$ [11]

Mohd Razali Muhamad et al (2005) The primarily motivation behind the execution of movement and time contemplate by respondent are increment profitability, work proficiency, quality enhancement, lessen activity time per part, contend in neighborhood showcase and satisfying business sector request. The achievement of the of usage movement and time examine had been contributed by a few achievement factors, for example, top administration duty, interdepartmental participation, great arranging and control

Framework, organization method capacity, compelling preparing, experienced work powers, unfaltering support inflow and clear item system. Sadly, the organizations executing movement also, time examine confront numerous difficulties, for example, collaboration from laborers, trailed by unpracticed venture pioneer, inaccessibility of pertinent specialist, staff preparing and absence of bury departmental participation [17].

Cengiz Durana et al (2015) a firm that produces tea glass is broke down in wording work/time amid the procedure of model creation. With the end goal to gauge productivity of tea glass models, time overview is made and by the assistance of that strategy institutionalized time is determined. Genuine time and institutionalized time is thought about and thus it is pointed that estimating inescapable occasions and avoid potential risk against them. As a aftereffect of the examination, holding up time cause wastefulness in crafted by disintegrate and in the substance of work/time, effectiveness is expanded 53 percent and model generation limit is come to at 237 [18].

III. REVIEW COMMENTS

Here, the authors have presented review of value stream mapping and kaizen from this method we get the motion and transportation defect to reduces, time study and 5 whys are applying to sustainability at winding area. By doing the value stream mapping we get the more space at the job shop area and we reducing the non value added time. By value stream mapping and applying kaizen lead time reduce and the productivity will be increase

IV. FUTURE PLAN

Authors are presently working in TBEA EI company near karjan Vadodara Gujarat that is transformer manufacturing industry Getting more space area so It can make coil assembly station so production will increase. By the motion will reduce

and transportation also so we get the extra time also because the movement of the EOT cranes will be less. Using kaizen in the tool area and in winding area so lead time reduces and using 5 why also.

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