

Application of 5S and Lead Time Reduction Tools- A Review

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Abstract: In this paper, a examine carried out of ways different authors follow 5s in different kind of industry. A few authors are following aggregate of 5 s and VSM in one single corporation. 5s is base of TPM, TQM, kaizen, TPS manufacturing tools. 5s is likewise used as first step of tpm events. By this paper, we figure out that 5s tools is vital tool for implementation of lean production. This paper also provides an explanation for trouble confronted with the aid of exceptional industries related to delivery time, production lead time or production lead time. For conquer this hassle, corporations had been carried out lead time reduction tools like 5s, kaizen, SMED, vsm, standardized, work observe, it idea and so on.

Keywords: 5S methodology implementation, lead time reduction, space utilization.

I. INTRODUCTION:

The global state of affairs wishes that manufacturers acquire excellent capabilities in phrases of quality, production, delivery, consumer demands and cost optimizations. Lean manufacturing concept is widely use in current industries. Lean principles is most favourable principles to develop high standard, high quality and well organized firm. Lean tool set is mostly trigger MUDA(wastes)which is unfavourable to company's productivity. If we eliminate MUDA from company, then we achieve high reliable firm. MUDA is form of waiting, overproduction, transportation, defect, over processing, unnecessary inventory, unutilized talent, unnecessary movement. Lean tools are most advantageous to firm which is wish to achieve good quality, on- time delivery, standardized work place, easy work flow, process improvement. for process mapping of company, many tools are useful. But mostly and most effective tool is value stream mapping's map is map process from supplier to customer's includes information flow, material flow, lead time of all processes.so we can use combination of VSM,5S and Kaizen, TQM to achieve high reliable and stable firm. Befits that cost optimization, failure and accident reduction.

II. LITERATURE REVIEW:

2.1 REVIEWS ON 5S:

Most. Ishtat Islam(2016)at 1 describe the technique for achieve healthy workplace and most effective space utilization tool. For this agenda, Authors applied 5S work organization technique. They selected trims store department, SQ Birichina Limited, Bangladesh for 5S implementation. They also used PDCA cycle for continues improvement and proper execution of implementation in firm. Positive results are that they achieved 27% space utilization and 82% of time saving for searching file. Other improvement in flow and moral of employees [1]

Cristina Veres et al(2017) derived that 5S methodology, overall performance have positive correlation and that both dependable variable. By this extraordinary research resulted that the hypothesis h1 become confirmed. Author find out that relation between 5S and productivity relationship in local company in Romania. Correlation display a wonderful relation among 5S level and productivity in an automobile cable production plant, and the goals described at the start has been fulfilled. Most truly answer is 5S Level has a positive moderate Pearson correlation (0.65) with Productivity, with a significance of 0.022.[2]

Mariano Jiménez et al(2016) examine current situation and develop high safety and work place standardization in industrial engineering university school.5S was applied to convert school Laboratories. Into industrial Laboratories. Authors were committed to maintain and continuous improvement. They got a 30% deduction in time, motions and waste transfers. Authors approx. 25% space in the work area and 100 h/year savings in practical implementation. [3]

Sk. Riad Bin Ashrafet al(2017) developed high stable organization by implementing 5S in R5 Food & Beverage Ltd. This firm produces distinct Food and beverage items like glass water, juice and lollipop etc. company was got some opportunity to improve as a problem in running its operation due to various troubles in machinery, equipment and space utilization, worker productivity, Neatness of the company floor and so forth. They saved cost RS 37505 and productivity increased 38.65%. [4]

Chetan Choudhari et al(2012) applied 5S tool of lean concept to solve the troubles occurred in workshop at JIT. Problem in space optimization and waiting time. After application of 5S philosophy in in the store room and fabrication shop.The workspace became good and well arranged, shortening of the time of seeking necessary things, proper space utilization, safety improvement, clean workplace, and development of the work environment and moral of workers was so easy. After implementation of 5S the efficiency of foundry shop & store room improves to 86.64 % & 93.36%, whereas overall efficiency is 79.31%. [5]

Aman Gupta et al (2015) applied 5S tool in small local industry. Problems like utilize space, larger lead time of manufacturing, safety issue encountered in this research. They achieved reduction of tool searching time from shop floor has been reduced from 40 minutes to 5 minutes. Per month RS 515 saved after successfully implement 5S. [6]

Lokunarangodage C.V.Ket al (2015) prepare generic model of ISO 22000 with 5S for tea industry. ISO 22000: 2005.ISO 22000 is Standard Organization developed the ISO 22000 Food Safety Management System (FSMS) to harmonize the requirements of various food safety standards into integrated system while eliminating lots of trade issues faced on exports.5S is tool which used for proper work place organization in tea industry. main aim of this study is to increase safety of food and higher work place organization. [7].

Soumya R. Purohit et al (2015) applied 5S tools in Sphoorti Machine Tools. Firm which sought for improvement in productivity and by successful implementation of 5S methodology has found increase in productivity. Profit level increased. Other benefits of implementing 5S methodology included higher enthusiasm, high moral and reduction of communication gap between top management and workers. Safer working conditions and stability of firm was increased. Future scope of implementation of 7S because safety related issue in manufacturing area.[8]

Vibhor Kakkar et al (2015) works on implementation of 5S in Span Autotech Pvt. Ltd.company. Manufacturing sheet metal components. Company manufactures products by using processes- hydraulic power press cutting & bending; and welding. Company faced problem like No bin system was present. For transporting material to shop, simple trolley was used which takes lot of human effort and that isn't even safe Communication gap existed between management and team members. Finally, there were movement problems which exist, poor safety conditions and communication gap existed. After implantation 5S, they resolved whole problem and enhanced productivity up to 91% [9]

D. Selwyn Jebadurai et al (2017) applied implementation of 5S in sales warehouse of a manufacturing industry. This examination targets the wastes observed in warehouse and systematic elimination of them through 5 stages of 5S Unwanted items were eliminated. Proper cleaning and standardization were established and incremental improvement was observed from audit. [10]

Manuel F. Sua ´rez-Barraza et al (2012) study researcher findings, a group of reasons was found for applying the 5Ss in the larger globally level organisations to be analysed, Finally, a conceptual framework was prepared, based on the outcomes of comparing theory and fieldwork: this provides connections of 5Ss with continuous improvement programmes, known as Lean-thinking or Lean-Kaizen, in the organisations analysed. Four methods were used to combine information: filed observation, participative observation, documentary analysis, and semi-structured interviews and presentation.[11]

Vikram Singh et al (2018) reviewed 5S tools effectiveness of in firms. The tools And concept Of 5S Which are Used To Increase efficiency Of All Processes In manufacturing Industry. The Main Goal is To Reduce the Losses in the Industry and the Implementation of the 5S System.[12]

Arash Ghodrat et al (2012) examine previous studies about blessings of 5S implementation and its performance in organizations. Consequently, 5S can help the goals of employer to gain non-stop improvement in overall performance and productiveness and proper space utilization.[13]

2.2 REVIEW ON LED TIME REDUCTION TOOL:

H.N.Reddappa et al(2016) develop new approach for the reduction of process cycle time. Provides a short review of main Approaches correlated to cycle time's reduction in CNC machines manufacturing industry. In this research study, used VSM concept to decrease cycle time in the manufacturing of Structural components of milling vertical centre machine. They achieved benefits of overall lead time was reduced and MUDA (Wastes) were eliminated. The manufacturing cost was decreased by Rs 25,405/machine.[14]

P. J. Blanchard et al (1995) developed new concept of decreasing the process cycle time is shows by increasing the Reactivity of resin during the impregnation phase. Experimental studies were conducted within a Purpose-built RTM facility. Implementation of a phased catalyst system within a prototype RTM facility resulted in a 48% reduction in Moulding cycle time.[15]

Puvasvaran A. P et al (2018) redevelop method to decrease cycle time of the setup of job in a pressing machine. Problem in company due to the absence of standard operating procedure and workers perform the setup process in varying excessive working steps. New method of the coil setup was evaluated and standardized which able increment efficiency and reduce the lead time of the process. The outcome of this research work is a new Standard Operating Procedure (SOP) that able to reduce the cycle time and increase the Effectiveness of the coil setup. By this, Benefits is that Time is reduce by 40 sec and 12% of reduction of time compare to other methods.[16]

Ajay Johnson et al (2017) implemented lean manufacturing for reduction the manufacturing lead time of a Scaffold manufacturing company. They used vsm, 5S housekeeping, kaizen, SMED. By this technique, product will reach on the customer after 138 min. instead of 1148 min. From all the six zones on an approximate value of 2575 square feet area is saved. This must consider in amount it will be an amount of 90882 /- in a year. So, the total annualized savings due to the 5S housekeeping is 132807 /- rupees.[17]

Md Monir Hossain et al (2016) prepared VSM for reducing lead time and improve process they used just in time and Kanban production philosophy, and parreto chart. After lean tool implementation lead time of 521 min reduce to 366 min [18]

R. Suganthini Rekha et al (2016) used Value stream mapping and combination of Work standardization methodology and line balancing for reducing non value added activity. Total setup time was reduced by about 180 minutes and cycle time was reduce by about 98 minutes. Value stream mapping in gear box manufacturing company has outcome that reduction the manufacturing lead time from 7 Days to 5.5 days to attain the customer demand on time.[19]

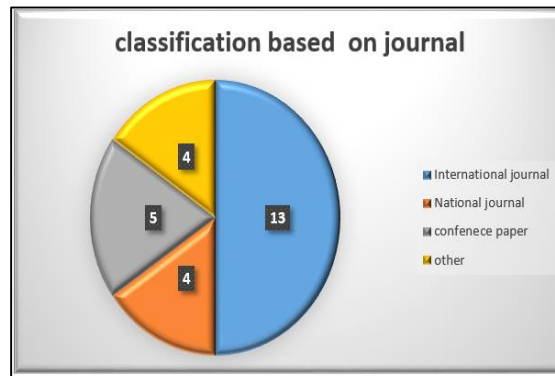


Fig 1 Classification Based on Type of Journal

Krunal Makwana et al (2017) used value stream mapping as major tools of lead time reduction. VSM future state map shows significant improvement in the production lead time 1.02 days to 0.79 days, which shows that any delay can be analysed Through value stream mapping.[20]

Anthony Metzinger et al (2003) studied and applied of the lean manufacturing Strategy that reduced the manufacturing lead time for manufacturing of the humeral head. The main goal of this research was to reduce lead time, Work-In-Process (WIP) inventory, and easy material flow, thus improving the productivity. Visual signals allowed the product to keep moving in the Process of production. The visual signal search and identified easily so that the worker knew to process the parts as soon as machine time was available. Deduction of lead time from 432hours to 240 hours was completed by reducing the amount of WIP inventory located between production operations used for shoulder head Production.[21]

John Miltenburg (1993) carried out research work to find out that how just in time is impacting on product manufacturing cycle time, cost of production and quality of product. This interesting fact of analysis that Move Kanban have virtually no effect on any improvements to cost. [22]

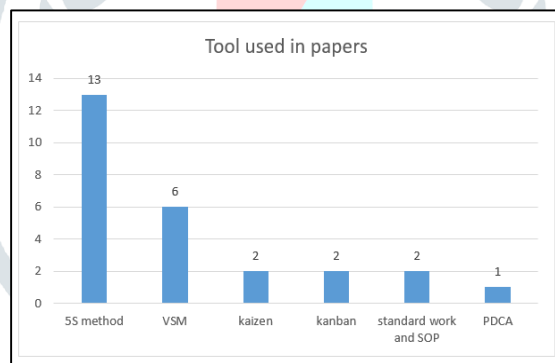


Fig 2 Tools Used In Papers

Pius J. Egbelu(1991) carried out project to optimization of total production time in shop floor. Author introduced a methodology for planning the machining and the material handling activities for the manufacture of small to medium size batches in a job shop is presented. By finding machining rate and batch lot size, easily achieving planning of machining and material handling activity. This model can be used with microcomputer in job shop floor [23].

Miltenburg et al (1996) introduced new method named as CTM (cycle time management and reduction). Author compared MTO,ATO and MOS with CTM.CTM is applied to a manufacturing environment it identifies the activities that represent the largest components of cycle time. Those activities are then targeted for cycle time reduction.[24]

Ahmad Naufal et al (2012) carried out project work on Kanban implementation in local manufacturing company in Malaysia. Autor studied step by step Kanban implementation and as well as achieving JIT in practices. Result could be achieve benefits that is lead time reduction, minimization of inventory and storage utilization in plant.[25]

Nagaraja T. K et al (2014) carried out work to reduction of manufacturing cycle time in steam turbine casing in Triveni Engineering & Industries Ltd,Karnataka. Author made SOP for proper execution of process sequence. Befits of this project was that reduction of manufacturing lead time 42 days to 30 days.[26]

III. REVIEW COMMENTS:

Organizations faced some trouble of unorganized workplace, lower productivity, larger production lead time, excessive setup time, unsatisfied customers, and unnecessary movement of work pieces, breakdown of machine. These problems are harmful to profitability and sustainability of organization and also quality of product is decreased .so, essential to eliminate these problems

from organization. 5S, SMED, Standardized work, JIT should implement in organization. For sustainability of 5S we can introduce PDCA evaluation sheet for continuous improvement. By this study we evaluate that 5S is most effective tool that can reduce manufacturing lead time of fabrication shop.

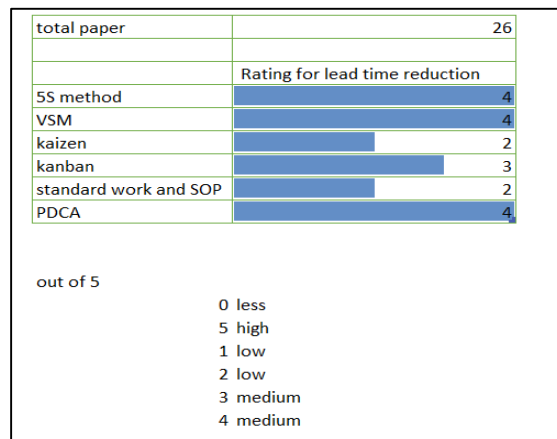


Fig 3 Rating For Selection Of Lead Time Reduction

IV. FUTURE WORK:

Authors are presently working in Oswal machinery ltd, G. I. D. C, anand, Gujarat that is crane manufacturing organisation. The product is unique sorts of crane, that is used in material handling. The study of various varieties of tools used in diverse organization and now with the help of 5S and other tools will used for reduction of delivery time has been targeted.

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