Application of Lean Manufacturing on Reduction of Down Time in Manufacturing Process of Rocker Arm

[1]VAMSHI S, [1]HEMANTH G S, [1]MANOHAR S H, [1]BHUMIKA L N, [2]VIJEE KUMAR.
[1]UG Student of School of Mechanical Engineering, REVA University, Bengaluru,
[2] Assistant professor, school of mechanical engineering, REVA University, Bengaluru.

Abstract— The method of lean manufacturing provides the qualiy of the products in minimum cost and provides customer satisfaction. At present present the industries facing high level of competition because of globalization,so lean is the latest tool to achieve it. The objective of this paper to study different lean concepts under various strategies. This study helps to find out the status of lean manufacturing and its way of implementations. This work emphasis on applications of lean manufacturing process in the operation of drilling with special purpose machine. as a result of lean manufacturing process changing the lay-out production time(cycle time) of "ROCKER ARM" has been reduced also in term of manufacturing efficiency or performance increased for the company.

Index Terms— Lean manufacturing, Productivity improvement, Implementation

1 INTRODUCTION

Lean manufacturing is a new echnology that is used in manufacturing industry o eliminate waste industrial waste which in turn reduses the cost of operaion, lead time of a product.The lean concepts mostly evolved from Japanese industries especially from Toyota. . Lean Manufacturing is a set of techniques, which have developed gradually over a long period and are based on various minor to major breakthroughs that help in reducing cost and hence increase productivity.

The word "lean" refers to lean manufacturing or lean production as it uses less of everything, compared to mass production. It only uses half of the human effort in the factory, half of the manufacturing space, half of the investment in tools and half of the engineering hours to develop a new product in half the time. Lean Manufacturing is considered to be a waste reduction technique as suggested by many authors, but in practice lean manufacturing maximize the value of the product through minimization of waste.

Vamshi S, School of Mechanical engineering, REVA University, INDIA, PH-8073974990. E-mail: reddybgp64@gmail.com
- *Hemanth GS, School of mechanical engineering, Reva University, INDIA, PH-7795695646 E-mail: hemanth.gs1998@gmail.com*
- *Manohar SH, School of mechanical engineering, Reva University, INDIA, PH-8971682457. E-mail: manoharhrmt@gmail.com*
- *Bhumika LN, School of mechanical engineering, Reva University, INDIA, PH-8951510895. E-mail: bhumikan18gowda@gmail.com*
- *Prof: Vijee Kumar. P, Assistant professor at School of mechanical engineering, Reva University, INDIA, PH-9902325016. E-mail: vijeekumar@reva.edu.in*

Lean principles defines the value of the product/service as perceived by the customer and then making the flow in-line with the customer pull and striving for perfection through continuous improvement to eliminate waste by sorting out Value Added Activity(VA) and Non- Value Added Activity(NVA). The sources for the NVA activity wastes are Transportation, Inventory, Motion Waiting, overproduction, over processing and Defects. waste is vital hurdle for VA activity. Elimination of these wastes is achieved through the successful implementation of lean system.Hence keeping this consequences ahead we have modified the existing proess layout into new modified layout by this we can reduce the cycle time of Rocker arm in the industry.IJSER staff will edit and complete the final formaiong of your paper.

2 PROBLEM IDENTIFICATION:

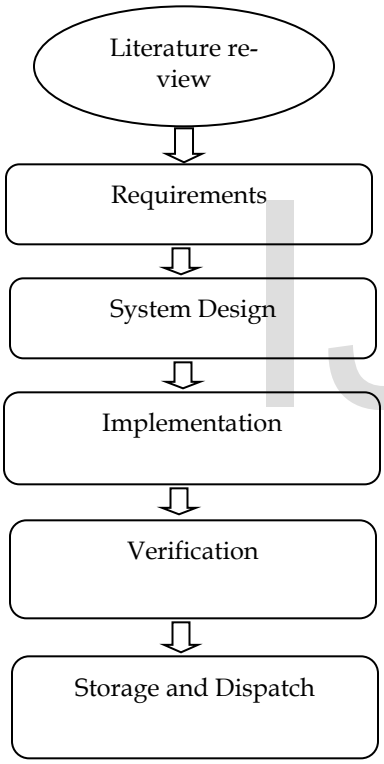
- In the manufacturing process, there are so many wastes that can affect the profit of the business. Waste is defined as anything that does not add value to the end product from the customer's perspective. The manufacturer must minimize the waste during producing the product so that the profit of the business can generate highly and the production cost can be minimized. The main task in this case is to implement lean methodology for "ROCKER ARM" production so that the waste can be eliminated.
- In the company normal manufacturing process by using VMC, the production of "ROCKER ARM" by 30min , the company facing low pro-

duction because the cycle time is more and also wastage is maximum , to minimizes these tasks in this case is implemented lean methodology for the production of "ROCKER ARM" , in the lean methodology the job is completed with in 4-5min , the cycle time is reduce , the rejection rate and the waste should be minimizes this leads to mass production by continuous flow process

3 SCOPE OF PROJECT

- Lean manufacturing technique that uses effective work place organization and standardized procedures to improve profits , safety , quality , Productivity , customer satisfaction and employee retenation

4 METHODODLOGY



4 BEFORE IMPLEMENTAON OF LEAN

EXISTING LAYOUT:

- Before the Lean manufacturing process, the operations is carried out in this system, this causes less productivity, more cycle time , high rejections etc.Here the machines are installed wherever the space is available and in unorganized manner. Hence it requires more floor space.There is a unnecessary movement between process in the layout.This effects the mass production and company profit also

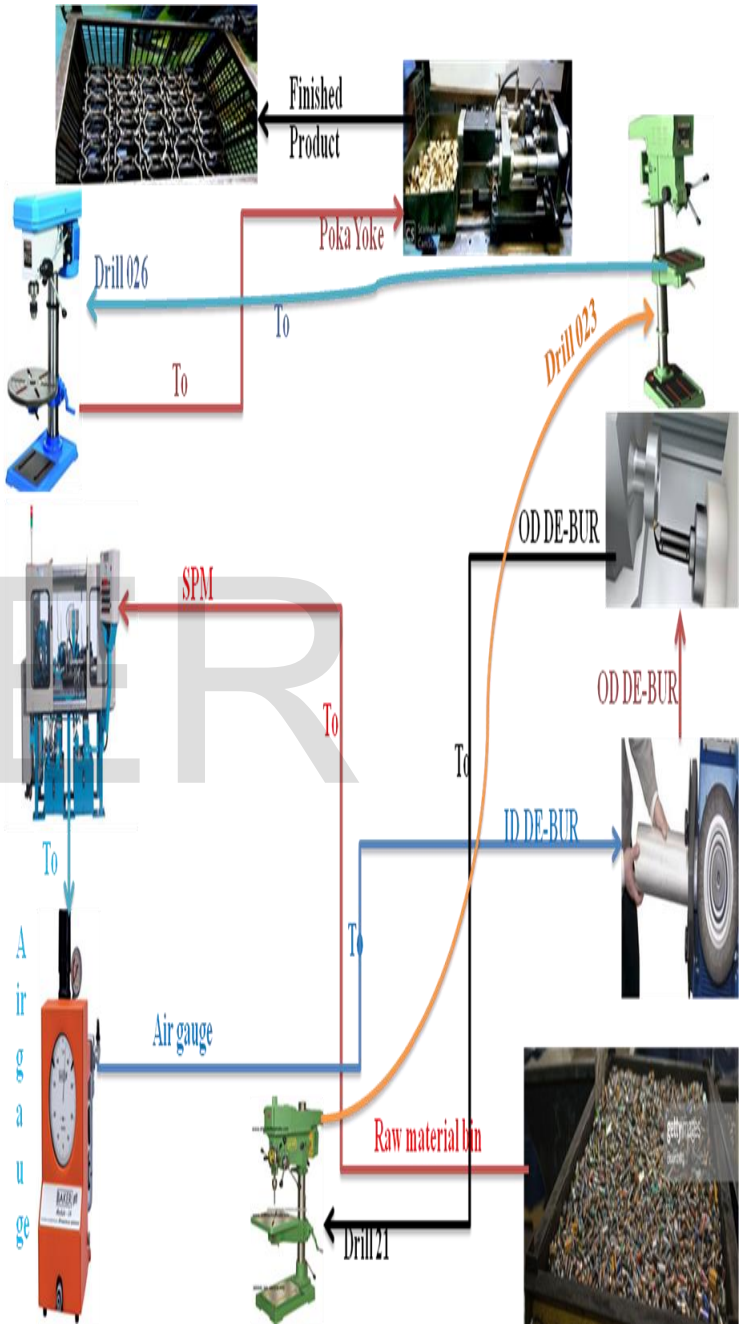


Fig: Processing layout

5 AFTER IMPLEMENTATON OF LEAN SYSTEM

PROPOSED NEW LAYOUT

By implementing the lean manufacturing system we can reduce the rejection rate,scrape rate,cycle time and high productivity can be achieved due to continuous flow will akes place.

Fig: Lean system Implemented layout

Objective of this method is to reduce the cycle time and defects & wastes of raw material and process will be carried out in the following manner.

1. Raw material Bin: storage of raw materials.
2. SPM 005 : Three stages carried out
(1). Dia 22mm drilling operation carried out
(2). Dia 17mm & 16mm drilling operation
(3). Boring operation carried out , diameter enlarged by 1mm it becomes 18mm and 17mm
3. Air Gauges: For measuring the dimensions.
4. ID Debur: Internal chamfer.
5. OD Debur: External chamfer.
7. Twin spindle Drilling machining:
(1).drilling, Dia 4.9mm for 17mm cross hole.
(2).drilling, Dia 4.9mm for 18mm cross hole
8 .DRL 073: Oil hole drilling of dia 5.7mm
9. DRL 071: Reaming of oil hole to 5.9dia.
10. DE-BER: Removing of burs on cross hole.
11. PRS 011: Enlarging grease nipple press & brass push of dia 22mm using poka-yoke technique
12. Finished product bin: Storage of finished products, next packing and delivery process carried out.

Table (1) Comparison betwen traditional method and Lean manufacturing system

Sl.no	Traditional mehod	Lean manufacturing system
1	Cycle time is15min	Cycle ime s 6 min
2	Less productivity	More prodciviy
3	Rejectons are more	Rejections are less
4	Less productivity	More productivity
5	More scrspe rate	Less scrape rate
6	Required more floor space	Required less floor space

6 CONCLUSION

Implementation of lean manufacturing in MAINI PRECISION Company is carried out by this. To implement it in a company for the first few weeks we tried to learn the processes in the company finishing department. Then study and analysis those processes are performed using some lean manufacturing tools and techniques and found some problems. Eventually some layouts and process flows are proposed that improves the productivity and reduce cost.

The better utilization of manpower and factory floor space is also ensured by implementing the proposed layout. At the same time proposals help to develop a good relationship among the workers and will provide an easier way for the management to coordinate and integrate the factory production with the current level of resources. These techniques can be implemented in any manufacturing company and it will help them to improve productivity at same level of resources..

ACKNOWLEDGMENT

Successful completion of any task would be incomplete without the mention of the people who made it possible, whose guidance and encouragement ordain our efforts with success. We consider ourselves proud to be a part of REVA University, the institution which stood by our way in all our endeavors. We express our sincere thanks to Dr. K S Narayanaswamy Director and Professor, School of Mechanical Engineering, for his support and encouragement. We express scholarly thanks to Prof.Vijeekumar, Assistant Professor, School of Mechanical Engineering, for his valuable support & for his inspiration, guidance, constant supervision, direction in successful completion of this project. We are thankful to the project coordinators, teaching and non-teaching staff members of School of Mechanical Engineering for their cooperation extended towards this project. Finally we express ourselves heartfelt gratitude to our parents, members of our family and our friends, for their constant support, motivation and encouragement throughout this project. Above all we would like to thank God, Almighty, for having showered his blessings on us.

REFERENCES

[1]. Benin Dergiz, Kunter S. Akbey, computer simulation of a PCB production line: metamodeling approach, Int. journal of production economics (63) 2000: 195-205

[2]. Rother, M., Shook J; learning to see: value added stream mapping to eliminate muda, the lean enterprise institute, Brookline, MA, 1999.

[3]. Graves R, Konopka, J.M.Miline, R.J, 1995. Literature review of material flow control mechanism: Production planning and Control 6(5), 395-403

[4]. S.G.Li, Y.L.Rong, the reliable design of one piece flow production system using fuzzy ant colony optimization, Computers & Operation Research 36(2009) 1656-1663

[5]. Singo, A revolution in manufacturing system: productivity system, Portland, 1985.

[6]. Liker, J.K, the Toyota Way, McGraw-Hill, New York, 2004

[7]. David Losonci, Krisztina, Demeter, IstavanJenei, factors influencing employee perceptions in lean transformations, Int. J. of production economics, 131(2011) 30-43

[8]. Armenakis, A.A, Bernerth J.B, Pitts J.P, Walker H.J, Organizational change recipients' beliefs scale. Development of an assessment instrument. The journal of applied behavioral science 43(4) (2007) 481-505

[9]. Rajesh Kumar Mehta, Dharmendra Mehta, Naveen k. Mehta, an exploratory studies n employees perceptions towards lean manufacturing systems, management &marketing, Volume(X) 2012, issue 1/2012.

[10]. Mcdenolad T., VenAken E.M, Rentes A.F, Utilizing simulation to enhance value stream mapping: a manufacturing, case application, international journal of logistics, Research and Applications, 5(2) 2002, 213-232

[11]. Rahani AR, Muhammad al-Ashraf, Production flow analysis through value stream mapping: A lean manufacturing case study: Procedia Engineering 41(2002), 1727-1734

[12]. Alavi S. (2003) "Leaning the right way", IEE Manufacturing Engineer, Vol. 82, No.3, pp. 32–35.

[13]. Bhasin S. & Burcher P. (2006) "Lean viewed as a philosophy", Journal of Manufacturing Technology and Management. Vol. 17, No. 1, pp. 56 – 72

[14]. Ciarniene R. & Vienazindiene M. (2012) ―Lean manufacturing: theory and practice‖ Economics and Management, Vol. 17, No.2, pp. 726-732.

[15]. Dixit Abhishek, Patel Sanjay, Dixit Anupam (2011) ―Lean Manufacturing to lean enterprises‖ proceedings of the International Conference on Industrial Engineering held at SVNIT, Surat, November 17-19, 2011, pp-431-435.