A Review Paper on Productivity Improvement Methods in Production Sector

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Abstract---Today's organizations are wrestling with a number of common issues. These issues include Productivity Improvement in every area of organizations. Any small change which lead to improve productivity in the organization will directly affects it's growth. While the attention to the technology aspect is critical, equally important is an attention to the change issues affecting people and the activities they perform, which are their processes and practices. The simple idea of increasing productivity will increase profits may not always be right. If a firm wants to increase its profits, it should increase productivity but at the same time taking quality of output into consideration. In any manufacturing or Production industry, main challenge in for production engineer is productivity. This paper attempts to cover some factors which are influencing Productivity of Manufacturing Sector and Organizational productivity.

Keywords:- Productivity, SMED, TPM, Kaizen

I. Introduction

Fabrication and Manufacturing and industry mainly faces problem of Productivity improvement. There are many factors which are critical to Productivity of these industries like Project Cost Overruns, Time management, Training method, Changeover time / set-up time of jobs, Added work lead to poor quality, Lack of focus and priorities about works, Inadequate resources at right time, Productivity is a measure of the rate at which outputs of goods and services are produced per unit of input (labour, capital, raw materials, etc.). Productivity measures are used at the level of firms, industries and entire economies. Depending on context and the selection of input and output measures, productivity calculations can have different interpretations. Productivity is a common measure of how well resources are being used or a measure of the effective use of resources usually expressed as the ratio of output to input.

II. Literature Survey

Lean manufacturing is "A systematic approach for identifying and eliminating waste through continuous improvement by flowing the product at the pull of customer in pursuit of perfection". K. Hemanand et al, attempts to improve productivity and profitability of Industry to reduce motion and transport wastes. .The machines are replaced and their orientations are changed for easy transfer of material and for sharing the idle time of the operators with other machines. The modifications in the layout will reduce two operators and increase the utilization of the operators by 11.95% [1]. Short Cycle Time Manufacturing (SCM) has been developed to help understand and measure the components of line performance and of capacity loss [2].

A positive strategic outcome of TPM implementations is the reduced occurrence of unexpected machine breakdowns, which ultimately results in enhanced profits in the organization. The results of the analyses indicate that TPM controls manufacturing cost, quality, and delivery time. TPM can be a strong contributor to the strength of the organization and has the ability to improve MP (Manufacturing performance) [5].

Norihiko Saiga states in his paper that the productivity of a service industry is low and causes a downturn of the global competitiveness of all Japan. Various factors exist about why the productivity of a service industry is low. Productivity improvement through Lean manufacturing means optimization and co-ordination of the input resources to minimize the wastes to reduce total production cost. This can be achieved by Lean thinking (to identify and eliminate wastes) and Lean Manufacturing (to improve efficiency and effectiveness of equipment) [4].

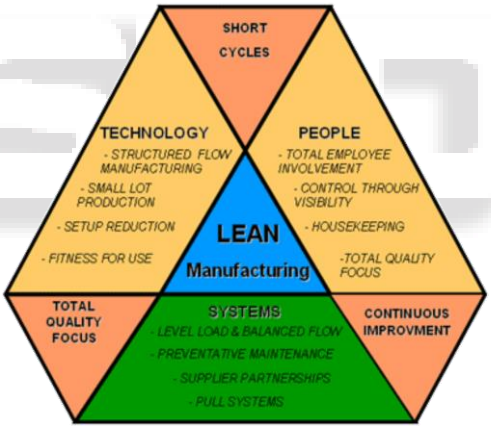

Fig. 1: Lean Manufacturing [4]

G. S. Nhlabathi et al addresses the application of manufacturing tool called manufacturing kaizen. Manufacturing kaizen refers to a method for improving a work process by the eliminating waste within an organization. The results shows kaizen tool transforms workplace can help in improving productivity in organization [6].

III. 7 Types Of Waste

Generally, there are 7 basic wastes which affect productivity of organization. In lean management system, they are Over Production (production continues even after target complete), Waiting time (non-value added activities time), Transport (unwanted movement of machine and material), Over Processing (Rework and Reprocess), Inventory (excess inventory without requirement), Motion (time waste by human), Defective good (wastage of resources used).

These are main wastage in Industries which generally causes Production loss, extra cost, cost of recovering loss, and cost of labour all this ultimately affects Productivity of Organization.

IV. Productivity Enhancement Through Waste Reduction

There are seven basic mudas (waste) in manufacturing industries which are defined in previous sections. To reduce those some strategic techniques come into picture which help in reducing mudas.

A. *Lean Manufacturing :* Lean manufacturing concept basically helps to work on 7 types of wastes. Basic of lean manufacturing process consider continuous improvement and to focus on elimination of waste and to reduce non value added activities. Lean manufacturing concepts are used by the industries to reduce work in progress inventories and also to reduce the waste for competing in the global market. The ultimate goal is to speed up the process there by increasing productivity through a proper utilization of man and machine. In a manufacturing industry, the layout and material flow in the shop floor decides its productivity. Material handling system also plays a key role in influencing productivity, throughput time and cost of the product.

1) *Smed :* Single Minute Exchange of Dies – The Single Minute Exchange of Die (SMED) is one important lean tool to reduce waste and improve flexibility in manufacturing processes allowing lot size reduction and manufacturing flow improvements. SMED reduces the non-productive time by streamlining and standardizing the operations for exchange tools, using simple techniques and easy applications.

The first step in the implementation of SMED is to separate internal (activities which can only be carried out when the machine is stopped) and external (activities which can be carried out when the machine is operating) setup activities. The second stage in Shingo's SMED methodology is to convert internal to external set-up activities. This will reduce waste related to Waiting Time. "Quick Changeover" is still a suitable method for manufacturing improvement [7].

2) *Tpm :* Total Productive Maintenance - TPM is a unique Japanese system of maintenance, which has developed by the Japan Institute of Plant Maintenance (JIPM). It has been very important tool for equipment intensive manufacturing sectors; it is a key means for increasing machine availability Total Productive Maintenance (TPM) is a maintenance program, which involves concepts for maintaining plant and equipment effectively. The aim of the TPM is to improve the labour productivity and to reduce the maintenance cost. It is a methodology that aims to increase the availability of existing equipment hence reducing the need for further capital investment [5].

TPM is a plan, which concentrates on total involvement of everyone from top management to all employees to implement a comprehensive maintenance program for all equipment throughout its life. This plan results in maximum effectiveness of equipment, tidier, neat and clean work place and morally boosted employees. TPM has been recognized as one of the significant operation strategy to regain the production losses due to equipment inefficiency. TPM helps in focusing on wastes like Waiting time, Inventory, Over Processing, etc. The importance of implementing TPM in industry is now well recognized.

3) *Kaizen :* Kaizen means improvement, continuous improvement involving everyone in the organization from top management, to managers then to supervisors, and to workers. In Japan, the concept of Kaizen is so deeply engrained in the minds of both managers and workers that they often do not even realize they are thinking Kaizen as a customer-driven strategy for improvement. The best way improve productivity is to practice Kaizen.

– Key steps to improve productivity:

a) Break down activities to smaller tasks – Smaller tasks are more manageable, easier to plan for and allocate time for. Each task you complete is an achievement which is encouragement that you are achieving your ultimate goal.

b) Eliminate waste – This method help in identifying 7 basic wastes and eliminate it.

c) Continuous Improvement – Using continuous improvement you will improve the process. It is simple to use, simple to plan for and easy to follow.

The introduction of Manufacturing Kaizen, labour productivity cold be improved over time and resultant transformation would lead to enhanced productivity within the organization [6].

V. Conclusion

The eight main factors that affect Organizational productivity are:

– Technical factors,
– Production factors,
– Organizational factor,
– Personnel factors,
– Finance factors
– Management factors,
– Government factors, and
– Location factors.

This context reviews some major methods of reducing waste which ultimately helps in recovering Organizational productivity. Few things concluded after reviewing above methods are:

– Every method primarily focuses on reducing muda (waste) in production, technical, organizational area. Because every section of organization incorporated with one of the seven types of waste.
– Continuous Improvement is not work of only top level management or only bottom level management. It should involve human beings who are working on different level of work structure.
– Implementing one method at a time is more beneficial than implementing all method at same time.
– Unless the awareness of all these method among all people in organization is increased, one cannot gain success based on this method. Management must understand and believe in the link between "doing things right at first time & always'' and the business strategy; understand the practicalities of these techniques and mistake proofing and be able to communicate the principles and techniques to all employees; participate in the problem-solving process to reduce waste. So training is must.

– Formulate and maintain a clear idea of what are the methods, how to spread awareness and mistake proofing means for the organization

REFERENCES

[1] K. Hemanand et al, "Improving Productivity Of Manufacturing Division Using Lean Concepts and Development of Material Gravity Feeder – A Case Study", International Journal of Lean Thinking Volume 3, Issue 2 (December 2012)
[2] Dr. Donald P. Martin, "Maximizing Productivity Improvements Using Short Cycle Time Manufacturing (SCM) Concepts in a Semiconductor Manufacturing Line, IBM Microelectronics Division", IEEE/semi Advanced Semiconductor Manufacturing Conference, River Road USA, 2000.
[3] Norihiko Saiga, Meijo, "Problem to Productivity Improvement of Service Industry Japan", Service Research and Innovation Institute Global Conference, Japan, 2012.
[4] Rishi Shukla, Mohan Trivedi, "Productivity Improvement in Coal Mining Industry by Using Lean Manufacturing", International Journal of Emerging Trends in Engineering And Development Issue 2, Vol.6.(September-2012)
[5] Manu Dogra et al, "TPM- A Key Strategy for Productivity Improvement in Process Industry", Journal of Engineering Science and Technology, Vol. 6, No. 1 (2011) 1 – 16.
[6] G. S. Nhlabathi, P. Kholopane, "Using Manufacturing Kaizen to Improve a Manufacturing Process", Proceedings of PICMET '13: Technology Management for Emerging Technologies, South Africa, 2013.
[7] M. S. Desai, "Productivity Enhancement by Reducing Setup Time - SMED: Case study in the Automobile factory", Global Journal of Researches in Engineering Mechanical and Mechanics Engineering, Volume 12, Issue 5, Version 1.0, 2012.

