International Journal of Advanced Technology in Engineering and Science
Vol. No.4, Issue No. 06, June 2016
www.ijates.com
ijates
ISSN 2348 - 7550

LEAN MANUFACTURING BENIFICIAL FOR GREEN SUPPLY CHAIN MANAGEMENT TO REDUCE GLOBAL WARMING

Mohd Shoeb[1], Mohd Javaid[2]

[1&2] *Department of Mechanical Engineering, Jamia Millia Islamia New Delhi, (India)*

ABSTRACT

The manufacturing industries are identified that there are more lean wastes within their product during production. The major green wastes from their disposal methods have high influence on environment. These wastes have to be eliminated or reduced by practicing a suitable supply chain ie Green supply chain. In present most of the companies doesn't practice any supply chain in their organization. The implement of lean manufacturing and green supply chain could reduce the environmental pressures and wastes of the industries to some extent. The wastes identified in this process could be eliminated by using suitable lean tools and methods. The small scale industries experiences to reduce maximum wastes, so it has to integrate green supply chain for practicing lean manufacturing. The implementation of lean manufacturing has a best way for green supply chain management in industries. Lean manufacturing is more beneficial for Green practices and its implementation of Green practices in turn also has a positive influence on existing Lean business, as a result reduced global warming happened by manufacturing industries which is best solution in current scenario. Implementation of these technology reduce cost of poor quality, product cost and improve product quality.

Keywords: Lean Manufacturing, Green Supply Chain Management, Product quality, small scale industries (SSI), cost of poor quality, continual improvement,

I. INTRODUCTION

Lean Manufacturing has waste reduction tool which is focusing on the whole operation. It examines the total operations system during manufacturing from raw material to finished good. Production management guide the principle of Lean Manufacturing. Flow will improve when wasted time has been reduced, effort and processing. Lean challenges the principle of economy of scale, as a result larger the production run will lower the cost per unit of the product. Mainly Lean Manufacturing principles are focused on smaller batches for smooth production done in the plant.

Lean manufacturing is defined as "A philosophy, based on Toyota Production System, and other Japanese management practices which has used for to shorten the time between the customer order and the delivering of the final product to customer, by consistent elimination of waste". All types of companies, production process, distribution, software development or financial services can benefit from adopting lean philosophy. As long as a company can identify a value stream, from when the customer's order product to when they receive it, lean principles can be applied and waste removed [1].

GSCM is a concerted effort across the enterprise and is more than simply implementing some ecological practices, but rather a coherent approach for improving environmental and organizational performance of all levels of management (Zhu, et al., 2007)[2]

II. HISTORY OF LEAN

After World War II, Japanese manufacturers were faced with the dilemma of lot of shortages of material, money, and man power. These conditions resulted in the birth of lean manufacturing concept. Toyota motor company, led by its president (Toyota), recognized that American automakers of the era were out-producing their Japanese counterparts; in the mid 1940's American companies were outperforming their Japanese counterparts by a factor of ten. In order to make a move toward improvement has been done as soon as possible, Japanese leaders, such as, Shigeo Shingo and Taiichi Ohno, devised a new, disciplined, process-oriented system, which is known today as "Toyota Production System" or "Lean Manufacturing" [3]

III.LITERATURE REVIEW

Carvalho and Cruz-Machado (2009)[4] explore that the integration of Lean, agile, resilient and Green paradigms. They depict the relationships of green supply chain attributes and key performance indicators (KPIs) cost, service level, product quality and lead time in a conceptual model, which providing a thorough understanding of synergies and discrepancies between them. Synergies arise from the different characteristics of Lean and Green practices on the supply chain attributes of capacity surplus, inventory level, integration level, production lead time and transportation time.

Simpson and Power (2005)[5] find out the three main concepts of Lean manufacturing, supply relationship and environmental management practices. The authors investigate how a tight customer-supplier relationship could influence the supplier's green environmental management activities. It shows that having a best relationship with suppliers is key for a company in order to guarantee sustainability of their products and services. However, the authors also admit that increasing in transaction costs when including green environmental standards for purchasing criteria and has difficult of appropriately developing a set of environmental specifications and managing it effectively are very critical issues for success.

Venkat and Wakeland (2006)[6] analysed the environmental performance of Lean manufacturing and green supply chains using CO2 emissions as KPI. Emissions in a green supply chain are subject to the frequency and mode of transportation used, which depend upon the type and volume of inventory which held at each point in the chain. By using a simulation model of a green supply chain, the authors conclude that Lean supply chains are not necessarily Green. Mostly the small industries green due to its less inventory, less production, and proper maintenance.

Warnecke and Huser(1995) [7] explained lean production is an intellectual approach consisting of a system of measures and methods which when taken all together have the potential to bring about a lean and therefore particularly a competitive state in the industry. The main fields of activity concerned for product development, shop floor management, chain of supply, and to lesser extent after sales service.

Imtiaz and Ibrahim(2007) [8] demonstrated that the organizations have integrated some of the principles of lean production system (LPS) in construction, but with some difference. Some of the LPS principles are

incorporate more frequently than others. The organizations need to give importance to identify and reduce waste from all facts of construction operations. This can be done through the use of product planning, production process and workflow. Organizations also need to apply LPS principles holistically in construction by focusing on improving whole processes in the system. They have also found a correlation between operational performance and LPS principles.

IV.LEAN METHODS

These generally employed in implementing lean manufacturing system

- **Just in Time(JIT):-** This is the technique in which products that are needed that should be manufactured according to need.
- **5S:-***5S* is a set of techniques, all beginning with the letter "S." They are used to improve workplace practices that facilitate visual control and Lean implementation.

Seiri Separate

Seiton Set to order

Seiso Shine

Seiketsu Standardize

*Shitsuke*Sustain

- **Jidoka:-** This is a series of cultural and technical issues regard-ding the use of machines and manpower together, utilizing people for the unique tasks they are able to perform and allowing the machines to self-regulate the quality.
- **Kaizen:-** *Kaizen* is the concept of improving a process by a series of small continuous steps. Often times these improvements are small and hard to measure, however the accumulated effect is significant. Over the years, *kaizen* has evolved to mean improvement.
- **Kanban:-** *Kanban* is the revolutionary practice of using cards, for example, to smooth flow and create pull in a Lean system. It is also a continuous improvement tool. The cards represent and account for all the inventory in the system. By controlling the number of *kanban* cards, we control the inventory. *Kanban* is a technique used to control inventory, minimize overproduction and facilitate flow. The *kanban* cards are used to trigger replenishment.

V.BENEFITS OF LEAN AND GSCM:-

- Improve quality of product and reduce defects
- Reduce Inventory
- Require less space
- Safe worker environment
- Improve employees morale

VI. LEAN MANUFACTURING BENIFICIAL FOR GREEN SUPPLY CHAIN MANAGEMENT FOR REDUCING GLOBAL WARMING:-

Impacts of climate change upon Green supply chains and lean manufacturing which has to analyze the implications of climate change in order to reduce global warming.

Serious physical and, consequently, industries, economic threaten the business world as a result of climate change. Such threats vary across different sectors, although some opportunities may also appear. Extreme natural events and other phenomena related to global warming may damage industrial plants which produce lot of pollution and heat by using machines. The implement of lean manufacturing and green supply chain most efficient to reduce the environmental pressures and wastes of the industries to some extent. The wastes identified in this process could be eliminated by using suitable lean tools and methods. The small scale industries experiences to reduce maximum wastes, so it has to integrate green supply chain for practicing lean manufacturing. The implementation of lean manufacturing has a best way for green supply chain management in industries. The major green wastes from their disposal methods have high influence on environment. These wastes have to be eliminated or reduced by practicing a suitable supply chain ie Green supply chain. In present most of the companies doesn't practice any supply chain in their organization, where improving product quality, reducing production costs, and being "first to market" and quick to respond to customer needs are critical to competitiveness and success. Lean principles and methods focus on creating a continual improvement culture that engages employees in reducing the intensity of time, materials, and capital necessary for meeting a customer's needs. While lean production's fundamental focus is on the systematic elimination of non-value added activity and waste from the production process, the implementation of lean principles and methods also results in improved environmental performance.

VII. CONCLUSION

By using lean and GSCM, there is reduction of waste of product during production cycle. The major green wastes from their disposal methods have high influence on environment. These wastes have to be eliminated or reduced by practicing a suitable green supply chain. In mostly industries lean and GSCM are not implemented. The wastes identified in this process could be eliminated by using suitable lean tools and methods. Lean manufacturing is more beneficial for Green practices and its implementation of Green practices in turn also has a positive influence on existing Lean business, as a result reduced global warming happened by manufacturing industries which is best solution in current scenario. Implementation of these technologies reduces cost of poor quality, product cost and improve product quality. Impacts of climate change upon Green supply chains and lean manufacturing which has to analyze the implications of climate change in order to reduce global warming. Serious physical and, consequently, industries, economic threaten the business world as a result of climate change. Such threats vary across different sectors, although some opportunities may also appear. When we concentrate on waste reduction and production cycle that should be totally green, there will be good changes in environmental air quality.

REFERENCES

[1]. Singh, R., (1999). Lean Manufacturing: Changing Paradigms in Product Manufacturing, the third International Conference on Quality Management, Delhi, India.

[2]. Zhu, Q., Sarkis, J. & Lai, K., 2007. Green supply chain management: pressures, practices and performance within the Chinese automobile industry. Journal of Cleaner Production, 15(11-12), pp. 1041-1052.

[3]. Karlsson C. and Ahstrom P, 1995, "Change processes towards lean production: The role of the remuneration system" International Journal of Operations & Production Management, vol. 15, no. 11, pp. 80-99.

[4]. Carvalho, H. and Cruz-Machado, V. (2009). Integrating Lean, Agile, Resilience and Green Paradigms in Supply Chain Management (LARG_SCM); *Proceedings of the Third International Conference on Management Science and Engineering Management*, pp. 3-14

[5]. Simpson, D.F. and Power, D.J. (2005). Use the supply relationship to develop lean and green suppliers; *Supply Chain Management: An International Journal*, Vol. 10, No. 1, pp. 60-68

[6]. Venkat K. and Wakeland, W. (2006*). Is Lean Necessarily Green*?Proceedings of the 50th Annual Meeting of the ISSS, ISSS 2006

[7]. Warnecke H. J. and Huser M, 1995, "Lean Production", International Journal Production Economics, vol. 4, pp. 37-43.

[8]. Imtiaz, G. and Ibrahim, A. R., 2007, "Lean production system to enhance performance in operations: an empirical study of Malaysian construction industry", Proceeding of IGLC-15, Michigan, USA, pp. 147-156.