

# A Review of Optimization of Industrial Waste Management by Lean Manufacturing

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**Abstract** - Manufacturing organizations are under pressure to improve productivity and reduce costs through realization of lean manufacturing. This paper approaches lean manufacturing and aims to identify and measure the intimately associated parameters of lean manufacturing and also examines the weight of their contribution to overall lean manufacturing. Hence, a collection of reliable tools and techniques are vital for decreasing costs and wastes and for providing effective services for customer demands. Given that lean concept attempts to decrease costs and wastes. Waste reduction is a very important factor in the overall growth and development of economy of an organization because by waste reduction we will reach much near to high productivity and profit. It is the current issue that some industries goes for high production but does not focus on that how much waste is comes out from industry. That person takes this topic very easy but it is very important. Because waste is not a single type, it is in different forms present in industry. So the only way to survive and meet the competition is by improving efficiency and cutting the costs through waste minimization and definitely our productivity will be improve. But before these all benefits we have to implement this Lean system properly. This is not a management based system; this is not a workers based system but it is a team work, means everybody is the part of this system. It has a number of benefits over traditional processes.

**Keyword** - Industrial waste management, Lean Manufacturing, Analytical Hierarchy Process (AHP)

## I. INTRODUCTION

To stay close to the customers in this competitive product market it is essential for sustained growth and continuity of business. This forces all organizations to continuously evaluate customer needs and problems and take the best possible course of action to satisfy them. The need of the hour is to deliver high quality products through continuous improvements in product features, bring new products to the market, and make product changes faster and more manageable and economical. Manufacturing organizations throughout the world are under great pressure to reduce time to market, reduce the cost, and meet the global quality standards, while coping with variety or customization pressure. All manufacturing activities necessarily generate

some form of waste. The manufacturing process does not consist of hundred percent of conversion of material and energy inputs into usable final products; thus making wastes inevitable. When the waste generated exceeds the maximum assimilative capacity of the environment it becomes pollution. This works focus on Lean Manufacturing technique with manufacturing flexibility, which aims at elimination of wastes there by reducing the environmental degradation.

### A. Seven types of wastages under Lean Manufacturing

1. Overproduction
2. Waiting
3. Transportation
4. Processing
5. Inventory
6. Motion
7. Defects

### B. Key performance indicator in Lean process management

Systematically implementing improvement actions based on customer expectation and strategic decisions through business processes, and prioritizing improvement actions will definitely contribute to strategic objective of process management. Workers initiatives and combined with their enablers directly link down the strategy of those activities at the operating level of the business which contribute most to manufacturing excellence. Upton, looked at features of successful Improvement initiatives in his paper. Two of the features are emphasis based on clear targets and common understanding of direction which involves a unifying picture to hold the improvement programmed together and consistent focus on improvement which means using the picture identified above and using previous improvement activities to direct new activities. Timothy and Clinton, suggest that goal setting and timely feedback will lead to improved work performance, greater efficiency, and the establishment of more challenging goals. It provides significant insight into ways to improve productivity through the use of goal setting and performance feedback implemented by information systems.

### C. Respect for people in Lean process management

Top managers who practice Lean management must make greater efforts to ensure that they understand the true meaning

of kaizen – “change for the better” – and the “continuous improvement” and “respect for people” principles. This paper describes how an important principle of lean process management, “respect for people,” was not understood by most management practitioners, thus hindering efforts to correctly practice Lean management and improve business performance. Emiliani and Stec, examine why most Lean transformations achieve only modest favorable results, despite years of effort. They provide specific suggestions that will enable senior managers and organizations to achieve improved outcomes and identifies numerous common errors made by senior managers, the rationale for why the errors have occurred, and suggests improvements for implementing the Lean management system by seeking to implement a Lean transformation; Senior managers must realize that they are embracing for the first time a principlebased system of management whose objective is to change the way all work activities are performed, not just those in operations. Emiliani, focused on Continuous personal improvement. Success with lean can be limited unless recognize the behaviors of employees that changes in business process. The study produce the model which serves as a foundation for those familiar with world class manufacturing methods to focus on self-improvement efforts and useful as a mnemonic device to simplify the difficult task of personnel development, as well as ensure consistency between business process and group of individual behavior.

The principle of lean manufacturing, of which process improvement is an important element was brought to the attention of the West by the publication of “The Machine that Changed the World” by Womack et al. Lean principles, exemplified by the Toyota Production System (TPS), continue to greatly interest the operations community. Many credit Toyota’s sustained success to their persistent and pervasive application of these ideas to manufacturing and management systems

The best evidence of this phenomenon is the increase in the number of lean transformations all over the world in the preceding 10–15years (Braun and Mefford, 2003).

The manufacturing organizations world over are trying to become more competitive and responsive to customer requirements by adopting lean practices and structures. Process improvement is aimed at cost cutting and product innovations on a continuous basis have become necessary for survival and growth of manufacturing units (G.Chauhan, 2011).

The applicability of lean production to knowledge work by investigating the implementation of a lean production system at an Indian software services firm was discuss on the basis of specific aspects of knowledge work—task uncertainty, process invisibility, and architectural ambiguity(Bradley, David, David M. Upton 2011).

Based on numerical studies and the analysis of a stylized model, they compare the benefits obtained by personnel transfers with those of temporary workers assessed find that temporary employment always decreases the number of permanent workers. Results indicate that personnel transfers are more effective in larger manufacturing (D. Francas and Minner, 2011).

The productivity improvement and cost cutting through lean manufacturing in manufacturing organizations. They identify and measure the intimately associated parameters of lean manufacturing and also examine the weight of their contribution to overall lean manufacturing in manufacturing organizations (G. Chauhan, 2012).

The efficiency will be increase by waste reduction because waste consumes so much finance and time, if it eliminates then our profits will be automatically. Lean manufacturing implementation can also improve productivity and overall profit (V. Chahal, S. Sharma, G. chauhan, 2013).

A collection of reliable tools and techniques are vital for decreasing costs and wastes and for providing effective services for customer demands. This study aims to identify the effective lean tools required for eliminating wastes in the supply chain (M. Manzouri and M.Nizam, 2014)

## II. RESEARCH OBJECTIVE

The main objectives of the Research can be formalized as follows:

1. To integrate process models within scheduling and planning formulations, considering different levels of detail.
2. To propose methodologies that extend the functional scope of the planning and scheduling problem, and allow to assess several objectives, such as economic, safety and environmental.
3. To present reactive strategies for dealing with the scheduling problem under uncertainty.
4. Efficient production practices leading to waste minimization can achieve more output of product per unit of input of raw materials.
5. Economic returns. More efficient use of products means reduced costs of purchasing new materials improving the financial performance of a company.
6. Quality enrichment of products produced.

## III. RESEARCH METHODOLOGY

Finally, the lean initiative should occur contemporaneously with the research study. By conducting a study as events unfold, researchers are able to view the process taking place, as opposed to just the outcome. This study followed established case study methodology for data collection and analysis after we selected the site and gained access, we crafted our protocol, entered the field, analyzed the data, and

enfolded the literature until closure was reached. While designing the question model for the protocol, we will consider some factors like time constraints of people in industry, reluctance to furnish information on a subject like lean manufacturing and the actual form in which this information would be available within the industry were taken into consideration. These factors will depend on some basic parameters like elimination of waste, continuous improvement, zero defects, just in time deliveries, pull of raw materials, multifunctional teams, decentralization and integration of functions

The methodology adopted includes the following:

1. Basic Survey of manufacturing Industry
2. Prepare a questionnaire covering various elements of LM.
3. Collection of data from above questionnaire and through personal visits.
4. Analysis of information and assessing the status of LM in survey firms.
5. Assessing the correlation analysis between various elements of LM.

#### A. Basic Survey of manufacturing industry

The survey will be carried out in an Indian manufacturing industry. A manufacturing firm is likely to reflect, to some degree all measures of manufacturing processes included in the study. Considering that the targeted survey respondent should possess adequate knowledge to complete the instrument, which included manufacturing processes measures within the responsibility of top management, plant managers or senior executives of manufacturing systems were the target respondents. Manufacturing firms of a reasonable size (medium to large) would be chosen for the survey.

#### B. Prepare a Questionnaire

The questionnaire is prepared and the internal reliability of questionnaire items is tested by calculating Cronbach's alpha using the IBM SPSS 11.01 software. The questions prepared will be tested for the reliability and waste optimization.

#### C. Assess the Weightage of Different Processes

Although various measures, as listed above, contribute towards manufacturing processes yet their contribution cannot be assumed equal. Weightage of some measures may be more than others. To determine their relative weightage, the analytical hierarchy process (AHP) was employed. Each measure is compared with other measures pair-wise.

#### D. Analysis of information and assessing the status of LM in survey firms

The current Information will be analyzed and assessed as per the industry standards and Lean Manufacturing method will be applied in the manufacturing Processes to optimize the waste in the Industry.

#### E. Correlation between various parameters of lean manufacturing

To find the relationships between various parameters of lean manufacturing, Pearson's coefficient of correlations were worked out using SPSS.

### IV. CONCLUSION

From regulatory compliance to positioning the company as an industry leader of the future, there are many reasons to implement a waste minimization strategy. The benefits range from cost savings to risk avoidance to carbon reductions and more. With so much to gain, the only thing manufacturers have to lose is waste.

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