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Keywords: *lean manufacturing, material, time study, method study.*

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Productivity Improvement by Lean Manufacturing an Automobile Industry with the Help of Method Study

Jitendra Mandloi [α] & Mr. Abhishek Yadav [σ]

Abstract- **In assembly line design, the problem of balancing has received most attention from past researchers, and a number of algorithms have been devised for the analysis of single, multi- and mixed-product assembly lines. In many cases, such algorithms seek a solution for the particular situation, which is under consideration and therefore have very little flexibility for generic application to assembly line design. Real life practical design issues include stochastic operation times, parallel workstation requirements, feasibility for workstation combining, and parallel line implementations, all of which are features which are ignored in many analyses.**

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I. Introduction

Lean design is the continuous improvement of facilities, equipments, tooling, and layouts that utilizes the best practices of lean manufacturing to achieve company goals. Company should make lean strategies to support lean design of facilities, equipments, tooling and layouts. Company can continuously improve leanness of a plant, during the future project and changes, by implementing lean program according to the lean strategies. For example whenever there is a change in the layout company should keep in mind the present condition of calculated lean parameters and design new layout accordingly.

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".

Lean manufacturing concepts are mostly applied in industries where more repetitive human resources are used. In these industries productivity is highly influenced by the efficiency working people with tools or operating equipments. To eliminate waste, it is important to understand exactly what it is and where it exists. The processes add either value or waste to the production of goods.

II. Aim of the Paper

Find out and measure effective lean strategies that support continuous improvement through, developing a system, which is easily manageable (e.g. length of assembly line, operator density, equipment location, visual control etc.) Built in quality and feedback (e.g. repair station, and on, inline inspection stations etc.), efficient operations (e.g. eliminated isolated work station, maximize man and machine utilization, avoid non value added activities, maintaining continuous flow etc.), maximize throughputs, safety and ergonomics point of view e.g. minimize fork truck delivery.

When companies implement several or all of these lean methods, several outcomes consistently result:

- Reduced *inventory* levels (raw material, work-in-progress, finished product) along with associated carrying costs and loss due to damage, spoilage, off-specification, etc;
- Decreased *material* usage (product inputs, including energy, water, metals, chemicals, etc.) by reducing material requirements and creating less material waste during manufacturing;
- Optimized *equipment* (capital equipment utilized for direct production and support purposes) using lower capital and resource-intensive machines to drive down costs;
- Reduced need for factory *facilities* (physical infrastructure primarily in the form of buildings and associated material demands) by driving down the space required for product production;
- Increased production *velocity* (the time required to process a product from initial raw material to delivery to a consumer) by eliminating process steps, movement, wait times, and downtime;
- Enhanced production *flexibility* (the ability to alter or reconfigure products and processes rapidly to adjust to customer needs and changing market circumstances) enabling the implementation of a pull production, just-in-time oriented system which lowers inventory and capital requirements; and
- Reduced *complexity* (complicated products and processes that increase opportunities for variation and error) by reducing the number of parts and material types in products, and by eliminating unnecessary process steps and equipment with unneeded features.

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At the same time, lean implementation consistently fosters changes in organizational culture that exhibit the following characteristics:

- A *continual improvement* culture focused on identifying and *eliminating waste* throughout the production process;
- *Employee involvement* in continual improvement and problem-solving;
- *Operations-based* focus of activity and involvement;
- A *metrics-driven* operational setting that emphasizes rapid performance feedback and leading indicators;
- *Supply chain investment* to improve enterprise-wide performance; and
- *whole systems view and thinking* for optimizing performance.

III. Problem Environment

The objective of this paper is to use a case-based method to demonstrate how lean manufacturing principles when used appropriately, can help the industry eliminate waste, improve productivity and product quality, reduce lead time and obtain better overall financial and operational control.

IV. Method Study

a) Introduction

Method Study is the first of the two main divisions of w01\k study and i~ concerned with the way in which work is done. Method study is essentially used for finding better ways of doing work. It is a technique for cost reduction. The philosophy of method study is that 'there is always a better way of doing a job' and the tools of method study are designed to systematically arrive at this better way of doing a job. Method Study, as defined in chapter 1, is a technique for improving the efficiency of every type of work, ranging from that of complete factories to the simplest manual movements used in mass production.

b) Objectives

The objectives of method study can be:

- The improvement of processes and procedures.
- The improvement of factory, shop and workplace layout.
- The improvement of the design of plant and equipment.
- Economy in human effort and the reduction of unnecessary fatigue.
- Improvements in the use of materials, machines and manpower.
- The development of a better physical working environment.
- Improvement of quality of the products.

The distinction of method study is that it is a step-by-step procedure for improvements of methods of work, starting with the objectives, the selection of the activity to be studied, it proceeds to the collection and recording of the facts. The critical examination of the facts is the crux of the method study. This is followed by development of an improved method and the attainment of assured results· in terms of greater output, cost savings and other benefit. This standard procedure, with flexibility of critical examination makes method study the most penetrating tool of investigation known to the Management.

c) Method Study Procedure

This procedure involves seven basic steps as follows:

SELECT: the work to be studied

RECORD: all the relevant facts about the present method

EXAMINE: the facts critically and in ordered sequences, using the techniques best suited to the purpose.

DEVELOP: the most practical, economic and effective method having due regard to all contingent circumstances.

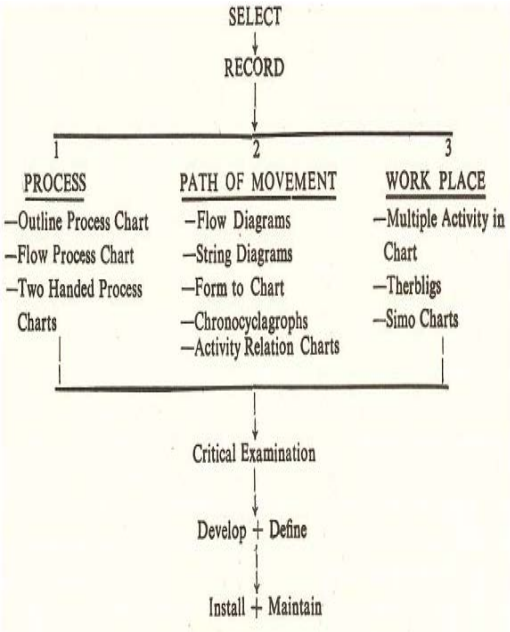
DEFINE: the new method so that it can always be identified

INSTALL: The method as standard practice

MAINTAIN: the method by regular routine checks.

It has been proved that the adoption of such a procedure ensures that no significant point is overlooked and helps in achieving maximum possible results. Each of these basic steps has been dealt in details in-the following chapters.

d) Method Study Procedure



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V. Conclusion

a) Major Finding and Implementation Details

The basic aim of the project is to make effective increase to productivity, which will help in assessment of leanness of the company. Company now has some parameters on the basis of which company can measure its existing lean condition of shop floor and continuously improve its leanness during the future project by improving the calculated productivity parameters.

Now company can plan its future program and new vehicles launch which required changes in facilities, layout etc by keeping in mind calculated productivity parameters; it helps to improve lean conditions of a company, from start of the project because it is better to work as per lean strategies from beginning rather than taking corrective action latter. After the analysis which company has certain base or thumb rule which help in improving manpower utilization and control of defects rate in future. On the basis of lean parameters, which are calculated for the present condition, company can improve its leanness during future project of increasing volume.

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