



# INTERNATIONAL JOURNAL OF PURE AND APPLIED RESEARCH IN ENGINEERING AND TECHNOLOGY

A PATH FOR HORIZING YOUR INNOVATIVE WORK

## STUDY OF JIT IMPLEMENTATION FOR IMPROVING MANUFACTURING FLEXIBILITY IN INDUSTRY

G. E. CHAUDHARI<sup>1</sup>, DR. S. G. PATIL<sup>2</sup>

1. Associate Professor, J.T.Mahajan College of Engineering, Faizpur, Maharashtra ( India)
2. Principal, DRGIT &R , Amravati, Maharashtra (India)

Accepted Date: 15/03/2016; Published Date: 01/05/2016

**Abstract:** Just-in-Time is a name given to an approach of continuous improvement in which non-value-adding activities or wastes are identified and removed for the purposes of reducing cost, improving quality, performance, delivery and flexibility. JIT relies on basic concepts from many disciplines, including statistics, industrial engineering, production management and behavioral science. For successful implementation of JIT all the elements (for example Buffer stock removal, employee empowerment, total quality control, shortly time, standardization etc.) must be properly understood, measured and implemented. JIT is not about automation. Typically, JIT eliminates waste by providing the environment to perfect and simplify the processes. Conceptual details of JIT and other such new approaches to manufacturing management are well known to many Indian firms. However, there is a lack of internalization of these concepts, leading to varying degrees of conviction and clarity at the time of implementation. This has resulted in wide variations in the perception and implementation patterns among Indian firms.

**Keywords:** JIT - Just in time, LTA – Loss time analysis, OEE – Overall equipment efficiency, Cycle time, FTF – floor to floor, Rolling.

Corresponding Author: MR. G. E. CHAUDHARI



PAPER-QR CODE

Access Online On:

[www.ijpret.com](http://www.ijpret.com)

How to Cite This Article:

G. E. Chaudhari, IJPRET, 2016; Volume 4 (9): 144-152

## INTRODUCTION

JIT is defined as management philosophy in order to reduce wastes and produces right amount at the right place at the right time. The wastes produced from the production line get add to it and this ultimately increases the cost without adding the value to the product. JIT is aimed to result better on time delivery performance, lighter equipment utilization, lesser space requirement, lower cost and greater profits.

JIT is originated by Japan in 1970's. It was developed and perfected by Taiichi Ohno of Toyota. The father of JIT-Taiichi Ohno developed this philosophy as a means of meeting customer demands with minimum delay. The implementation of JIT in Japan is seen to be as integral part of Japanese economic success. Japanese firm believe in the concept that there must be long term competitiveness rather than emphasizing the short term profit.

JIT-The stockless production lowers the inventory level by flowing the material (as they get manufactured) in production line through smooth and unimpeded way. JIT in such a way eliminates the bottlenecks in particular production line.

JIT is most applicable to automobile component production. The reason for this application is that operations or product formation does not change in whole production line cycle. The concept of quality and customer satisfaction is being challenged in recent years and new benchmarks have been established. Customer choice and perceptions had also been changing continuously and Japanese were the first to meet these challenges by introducing many innovations and inventions in manufacturing industries, one among which is JIT So far as the applicability of JIT in Indian firms are concerned, Indian firms has initiated steps towards JIT implementation. In India the size of firms is small comparatively and hence the type of concern could be different. In India economy is under the control of Government and the Govt. policies are not stable. Hence firms develop the short term perspectives and manage the business in accordance with past and current policies of Govt.

## 2. JIT IMPLEMENTATION

The JIT implementation methodology in any JIT enterprise could be explained under following headings:

- People development
- Manufacturing process improvement

- JIT enablers and their implementation technique

## **2.1 People Development**

There are three initiatives in order to follow people development in firms

### **2.1.1 Personal Development**

Make sure to utilize the full potential of each individual and contribute their excellence to the business. It works as a strong self-motivating factor for individual quality.

### **2.1.2 Team Working**

In team working process there must be strong communication, policy developed and strong leadership. Communication facilitates the efficient cascade and feedback of clear messages about continuous improvement.

Strong leadership could be achieved through group leader by Business understanding, Ability to manage change, Known to staff, Personal credibility. Policy development makes sure that improvement with organization's vision, goals, objectives should be exposed to all employees.

### **2.1.3 Employee Involvement**

Employee involvement principles are

Employee must feel that their opinions are listened.

Employee should involve in action that affects them.

## **2.2 Manufacturing Process Improvement**

Manufacturing improvement is directed by an initiative called 'Production Improvement Directions'. There are four initiatives to focus and prioritize the production improvement.

A) Workplace Practice

B) Production System

C) Process Capabilities

D) Process Optimization

## **3. JIT ENABLERS**

There are six enablers of JIT are .

### 3.1 5S

Sort: Clear out all unnecessary items

Shine: Keep it clean, visible and safe

Simplify: A place for everything and everything in place.

Standardize: Establish standard, for sort shine & simplify

Sustain: Seek further improvement



Fig.1: Sequence of activities in 5S implementation.

### 3.2 Kaizan

Describes a focused and supported event which initiates continuous improvement by giving employees-the skill, encouragement and opportunity to make changes which are positive. There are five critical features that make Kaizan to be successful.

- Use people
- Bais for action

- Focused effort
- Sustain
- Use initiatives

The implementation steps for Kaizan are:

- Plan
- The Kaizan Event
- Follow up

### 3.3 LTA (Loss Time Analysis)

An every production unit there are losses and these losses reduce output .There are six types of losses

- Factor that stop the process eg. Machine breakdown.
- Setup, machine and process adjustment losses.
- Change of shift losses.
- Minor stoppages.
- Reduce speed losses.
- Quality defects.

These above mentioned losses are having different causes & different solutions. To recognize these losses - called as LTA. There are four critical features that LTA programme need in order to be successful.

- Use people
- Use real data
- LTA is incremental
- Real improvement

The bottleneck machine should be analysed to establish the average production level. This production level is compared with the ideal production level. The machine or machining area does not achieve 90% effectiveness must be analyzed and improved through LTA. Once need for LTA is identified a cycle of five steps must be followed. The five steps are:

- Data Collection
- Data Analysis
- Identification of root cause
- Creation of action plan
- Do -check –act

After following LTA, it is found that machine having cycle time more when compared with the system follow JIT.

### **3.4 Standard Work**

By standardization-work operation & productivity is improved standardization is done by reducing process variability. For standardization following principles must be followed:

- Use people
- Sustain the gains
- Continuous improvement
- Display the standards
- Make standard work instruction accessible

There are four important steps to implement standard work

- Remove wastes
- Agree & record standard work
- Implement and use standard work
- Continuous improvement

The example given below shows the material in and material out in a sequential way through a process of standardization.

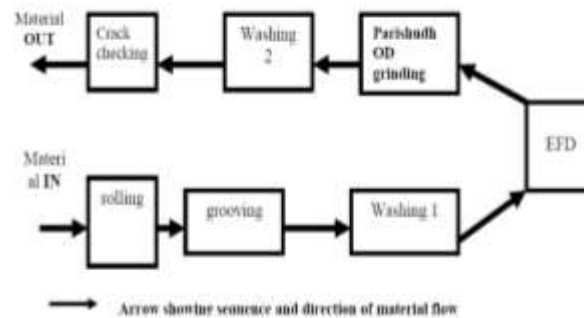


Figure 2 : Block diagram showing layout of cell

There are many tools used to improve the standard work. One among them is cell balancing. Cell balancing redistribute the labour activities within the production cell.

### 3.5 Cleaning Standard

#### 3.5.1 Autonomous Maintenance

It is defined as incremental process, when knowledge & skill are transferred from maintenance & process specialists to the operator of the machine. The four principles of effective implementation of autonomous maintenance are:

- Cost Vs. benefit
- Sustain the gains
- Continuous improvement
- Use People

The autonomous maintenance check sheet gives the description and specification for the process. The autonomous maintenance could be drawn as under:

#### 3.6 Autonomous Maintenance Check Sheet

- Continuous improvement
- Use people

For implementation of autonomous maintenance there are five steps

- Machine improvement activity

For implementation of autonomous maintenance there are five steps as follows:

- Machine improvement
- Identify tasks and transfer to the operator
- Formalize the task
- Sustain
- Initiate next cycle

### **3.7 Visual Management**

For effective Visual Management there must immediate action taken for immediate negative change. Implementation Steps for visual management are:

- Identify what need to be controlled
- Design a system of visual indicators
- Define & verify the reaction procedure
- Implement system
- Improve

Following sub steps were taken for implementation of Visual management in our project consideration.

Step - 1. Formation of team.

A team of cross-functional members was formed for implementation of Visual management.

Step- 2. Decide the action plan

Step-3. Implementation of Visual management.



## CONCLUSION

JIT makes the company competitive as there is reduction in changeover time, work in process inventory, manpower and manufacturing lead time. The procedure of collection of last time in machine and its analysis has resulted the improvement in consistency (of the machine). Visual management attracts in the line to see the improvement made during process. Weekly meeting of Kaizan gives a sense of total employee involvement As far as the autonomous maintenance is concerned, repair & maintenance is done before failure. Operators are given training in order to make the autonomous maintenance implementation successful. For removal of waste and unwanted material the JIT enabler 5S is to be implemented. The largest JIT factor is the improving manufacturing flexibility by reducing changeover time. Emphases should be placed to reduce the throughout time, elimination of unnecessary activity and simplification. Improvements activities are required to be carried out to survive in a highly competitive market. Emphasis should be placed on reduction of throughput time, elimination of unessential activities and simplification of essential activities while implementing a JIT system. JIT programme began with corporate wide employees development and emphasis on total quality control. Equipments has been modified to improve overall effectiveness. The largest JIT factor has been the improved manufacturing flexibility by reducing changeover time from one model to another.

## REFERENCES

1. Prasad B, JIT quality matrices for strategic planning and implementation, Int J Oprati prod manage, 15(1995) 116-142.
2. Vokura R J & R A, just – In –Time : the evolution of a philosophy, Prod Invet manage J, 31 (1996) 57-69.
3. Vart P, M mittal S & Tyagi k, Implementation of JIT in Indian environment: A Delhi study, Productivity , 34 (1993) 251-256.
4. Chandra and Kodali R, Implementation of JIT manufacturing system: an overview, Productivity 38 (1997) 312-321.
5. Deshmukh S G, Just-In-Time: A survey, proc Second SERC School Adv Manufact Technol, Institute of Technology, Bombay, (December). 9-21, 1996) 148-148.
6. Garg S, vart p & Kanda A, Work Culture in JIT environment, Productivity, 35 (1994) 463-466.
7. Garg D Deshmukh S G & Kaul O N, Attribute for JIT purchasing and supplier evaluation: A survey, Productivity,38(1996) 322-326.