

## A STUDY ON JUST-IN-TIME IN PRODUCTION BASED INDUSTRIES

**CH ASHOK**

Asst.Prof

Machine Design

Dept Of Mech

GDMM CET, Nandigama

**T.CH NAGARAJU**

Asst.Prof

Machine Design

Dept Of Mech

GDMM CET ,Nandigama

### ABSTRACT

*Rapid industrialization has increased competition in the market and it has become troublesome for the industries (especially for small scale industries) to persist with this kind of modern industrialization. Just-in Time system has been defined and identified worldwide by many researchers and practitioners for world class manufacturing. This system has been accepted as a systematic approach to achieve competitiveness and excellence in manufacturing by many researchers and practitioners in many countries in last three decades. This system has potential to compete in the present scenario of rapid development and growth of industrialization. This paper presents the spread of JIT movement, concepts, objectives, elements, benefits, implementation and motivation of JIT system. In order to survive in the market an enterprise should produce a good quality product which can be affordable to common man within a specific span of time. Management of time is of an immense importance for any enterprise or industry as it can accomplish more with minimum efforts. To overcome numerous problems Just-in-Time can be introduced to an enterprise. Just-In-Time deals with the production of any item after the order from consumer and not to produce items before the need or in advance.*

**Keywords**— *Just-In-Time (JIT), Production, Industrialization, Management, Enterprise.*

### I. INTRODUCTION

To meet the demand of consumers in time and to withstand in the highly competitive market Just-In-Time was introduced. JIT is an approach to eliminate the scrap and to avert the storage of any type of raw material in the industry. It originally referred to the production of goods to meet customer demand exactly, in time, quality

and quantity, whether the 'customer' is the final purchaser of the product or another process further along the production line. Inventory Cost is one of the main factors which increase the expenses of a manufacturing industry. By minimizing the stockpile of raw material, plenty of space can be saved, expenses reduce to greater extent, also reduce squander which comes from obsolescence, this is the main objective of JIT. In order to ease and support JIT Kanban was introduced.

Kanban is a Japanese word for card. Kanban system consists of card which acts as a signal which is delivered when there is scarcity of raw material, item or inventory. After receiving this signal the requirement is refilled accordingly and the productivity is maintained. It can be helpful to small scale industries as they do not have much budget for their overall expenses. Any industry applying JIT will not compete with any other enterprise as there will be no large capital fund required and the only aim will be to complete the production and manufacturing Just-In-Time.

Continuous improvement.

- Attacking fundamental problems - anything that does not add value to the product.
- Devising systems to identify problems.



- Striving for simplicity - simpler systems may be easier to understand, easier to manage and less likely to go wrong.
- A product oriented layout - produces less time spent moving of materials and parts.
- Quality control at source - each worker is responsible for the quality of their own output.
- Poka-yoke - 'foolproof' tools, methods, jigs etc. prevent mistakes
- Preventative maintenance, Total productive maintenance - ensuring machinery and equipment functions perfectly when it is required, and continually improving it.

## II. EVOLUTION OF JIT

Idea of Just-in-Time concept was derived in Japan by Toyota Motor Company. Everybody is familiar with the highly destructive World wars and their consequences. After the World War II, Japan faced economic crisis and it was very difficult to undergo industrialization under such circumstances. III-Effects of the World War II on Japan were-

- Economical crisis, poverty
- Shortage of space
- Lack of natural resources
- High unemployment

Japan could afford only to build up small scale industries and only storage of that raw materials could be done which can be currently used. In such a way capital cost and storage were minimized and as per

requirement further materials were procured.

Under such circumstances the president of the Toyota Motor Company suggested that they should come up with America within three years, else the industries, especially automobile industries, of Japan will not withstand anywhere. During that time, if one Japanese car worker produced one unit of car, at the same period of time an American car worker would produce nine units of car, that is, Americans were nine times ahead of Japanese car workers. So, Taiichi Ohno then thoroughly inspected the American industries and concluded that American manufacturers believed in mass or batch production and also they made good use of economic order quantities (EOQ). But Taiichi Ohno knew that this kind of methods will not work in Japan as they were facing many problematic situations and also the demand was low. Instead he focused on elimination of waste and composed a new system based on production by eliminating the waste. Thereby the concept of 'Just-In-Time' was introduced in early 1970s. This system really worked and later on it was widely copied inside and outside Japan. JIT got its multiple names, one of which is "Stockless Production" which was given by Hewlett Packard. By implementing JIT system Japan started their production and manufacturing accordingly.

## III. JUST-IN-TIME MEANING

As the name suggests 'Just-In-Time', that is everything should manage in time. This is a system which deals with the satisfaction of customer after the demand of that customer within a specific period of time. JIT concept mainly aims at -

- Eliminating the surprise orders from the customers which are sometimes received at the last stage of production.
- Balancing the process steps accordingly in a stepwise manner and to control it
- Completing the batches rapidly to meet the demand.
- Carrying on the processes such as if something has left the line then immediately that is added to the line.
- Minimizing or avoiding the stockpile of materials.

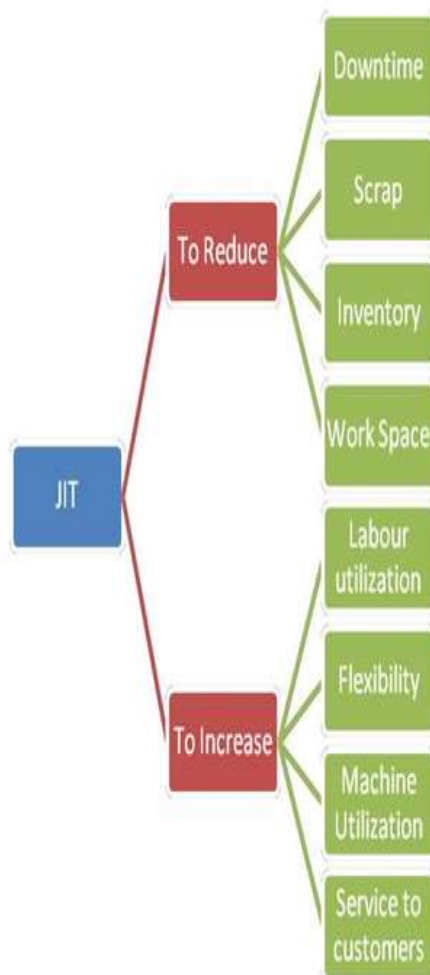


Fig. 1 Just-in-time concept

#### IV. IMPLEMENTATION OF JUST-IN-TIME

Implementation of JIT varies according to the companies, that is, small scale industries and large scale industries which depend upon various factors. For example, if there is large scale industry there will be more departments and production or manufacturing will be done at different places hence for implementation of JIT in such cases will require more interaction with all the departments of industries. While in small scale industries, JIT will be implemented faster than large scale industries because structure of their organization will be not much complicated as that of large scale industries. But because of this factor it doesn't mean that larger companies are poor in JIT implementation. In order to successfully implement JIT in an industry following must be preferred first:

- Immediate response to the customer's requirement.
- Unite and streamline all the processes which are included in the manufacturing and production systems.
- Participation of employee in meeting allegiances.
- Eliminate dispensable processes.
- Identify and exclude all sources of inventory.
- Implement Pull type production system.

#### V. PUSH TYPE AND PULL TYPE SYSTEMS

'Push type' means make in stock, in which the mass production is carried out without

demand of any consumer. After which it is stored in warehouse or storerooms.

'Pull type' means make to order, in which production is based on actual demand of consumer avoiding inventory. In simple words, consider suitable example such as 'Pull type' system is like an elevator, an elevator starts when the order is given no matter how many passengers are in it. Whereas, 'Push Type' system is like an escalator, escalator continues to move whether there are any passengers on it or not. Push and Pull systems can be differentiated as:-

PARAMETER	PUSH TYPE SYSTEM	PULL TYPE SYSTEM
PRODUCTION	APPROXIMATE	ACCURATE
LOTS	LARGE	SMALL
INVENTORY	HIGH	LOW
WASTE	MORE	LESS
COMMUNICATION	POOR	HIGH

Table no.1 Difference between Push type system and Pull type system

JIT implements Pull type system, the process can be shown as



Fig.2 JIT 'Pull' type system-example

### VI. IMPLEMENTATION OF JUST-IN-TIME IN MCDONALD'S

McDonald's (McD) is a fast food restaurant chain, which is serving 68 million customers approximately across 119 countries. Just in time is implemented in McD in order to produce efficient output with minimum lead time at lowest possible cost, minimizing waste with great consistency. It doesn't begin to cook its order until a customer has placed a specific order and then served to the customer.

The main objectives of this system are:-

- Create only what the customer wants.
- Produce product of good quality.
- Minimize waste of material, labour and equipment.



Fig.3. Process Overview

### 6.1 Benefits

- **IMPROVED QUALITY** – The burgers are prepared freshly and hence the quality is improved.
- **CUSTOMER SERVICE** – As the burger is made only after the order is placed, making special order is not an issue.
- **COST REDUCTION** – Due to significant reduction in wastage as uncooked material has higher shelf life.
- **REDUCTION IN WAITING** – Customer's waiting time reduce from 11 min. to just 2 min.

### VII. CONCLUSION

Just in time leads to producing the require items, at the required quality and in the required quantity within a limited time. It is an approach to achieve elimination of waste. Over production, defective products, inventory, waiting time are some of the examples which are minimized by JIT. JIT is a system of enforced problem solving. Managers have the choice between putting a huge effort in finding and solving production problems, or they can learn production without interruption. Quality within JIT is very necessary, because without any quality program JIT will fail. JIT system is based on pull system rather than push system, based on producing things until they are needed, where Kanban card is used as a signal.

JIT has its influence in ordering, scheduling and producing sides of a manufacturing industry. This influence in manufacturing industry depends on

employees, suppliers or customers. Large amount of training is put towards JIT to reach certain goals. One of these goals is mutual trust and team work which is an important factor in JIT principle. When managers and workers see each other equal, they are more willing to co-operate with each other and to find and resolve the problems. As there is industrialization in developing countries including India but they are not managed properly, JIT can be useful for improving the efficiency of these newly developed industries.

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