

# Importance of JIT in the Field of Construction Industry

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**Abstract:** *In recent years, India's construction industry has been recognized as very competitive and dynamic. To stay afloat in the increasingly competitive market, the construction industry has been attempting to implement innovative business concepts. Companies must try to provide high-quality, low-cost products that reach customers in the lowest amount of time. This is where new concepts such as Just-In-Time come into play, which focus on cost reduction by removing non-value added operations. This paper provides an overview of the Just-In-Time technique and determines the importance of the JIT method in the construction of multistory buildings by comparing the JIT method to the traditional method of material management and determining the benefits and limitations of the JIT method through a questionnaire survey.*

**Keywords:** Just-In-Time, Multistoried Building, construction industry, Inventory management.

## I. INTRODUCTION

India is a developing country and Indian industry has tremendous power to stand before the global market. Construction industry is one of the major industry and plays a vital role in Indian economy. The construction industry are particularly project based so the type of material may be same for each project but required material quantity, site condition, location, weather condition, etc. may vary from site to site. When looked upon with the eye of manufacturing industry the major challenge for building industry is , to create order and control in order to reduce costs through elimination of waste and to keep time plans because of postponements during the developed time frame. The contributing factor of the issue is the fact that construction industry greatly contains activities which do not directly affect to the final customer. Therefore, construction industry needs better methods of project management to achieve better project outcome.

The Just-In-Time (JIT) philosophy originated from Japan in the mid-1950 and created in the gracefully chain region by Taichi ohno and his kindred specialist at Toyota. It has been used in the manufacturing industry for many decades and helped to increased productivity of the industry and also increased the quality of the project.

JIT is a system that produces the required item at the right time and in the quantities needed. JIT principle says that inventories are not more important and should be considered as a waste. The defects not only produces construction waste but they can also discontinue the construction process. Since there is no inventory to cover up for mistake, perfect quality is required by a JIT system. JIT system is designed to expose errors and get them corrected rather than covering up with inventory.

## JUST IN TIME CONCEPT

Just in Time (JIT) production is a manufacturing philosophy is based on planned elimination of waste and continuous improvement of productivity. JIT is a system that can reduce overall cost, especially indirect cost while maintaining quality standards and reducing manufacturing cycle time or a production system that will deliver a custom product at the exact second where it is required by reducing nearby inventories and insufficient worker hours.

JIT Concept is, "Company produces only what is needed, when it is needed and in the quantity that is needed". The company produces only what the customer requests, to actual orders, not to forecast. JIT can also be defined as producing the necessary units, with the required quality, in the necessary quantities, at the last safe moment. It means that company can manage with their own resources and allocate them very easily.

## II. RESEARCH METHODOLOGY

### 2.1 Literature Survey

Literature review has been taken from previously published research paper mainly focus on topic Just-In-Time used in construction industry, from various international journals and researched thesis to understand the previous study done on relevant topic.

### 2.2 Comparison Between Conventional method and JIT Method of Material Management

#### Conventional Method

The fundamental difference between traditional and JIT strategies lies in the approach taken in the intermediate stage of construction. Traditional approach focused on storage of inventories throughout the process and holding a reserve as in case of unexpected demand or shortages.

The presence of inventory through the process allows managers to work around the daily tasks and problems, while decisions can be made and problems addressed. When a problem arises e.g. failure of any Construction process or equipment the problem is addressed and work continuous till the next problem. The majority of problems are not seen as major issues, as they become part of daily work life. Many times solution implemented are just short term fixes.

Buffer stock is available on site 10 to 15 days before start of any activity. Method of production can generally be organized in two ways, namely the pull and push system, traditional approach followed by push system where inventories are pushed forward based on planned schedule i.e. organization forecast the demand or maintain stock level.

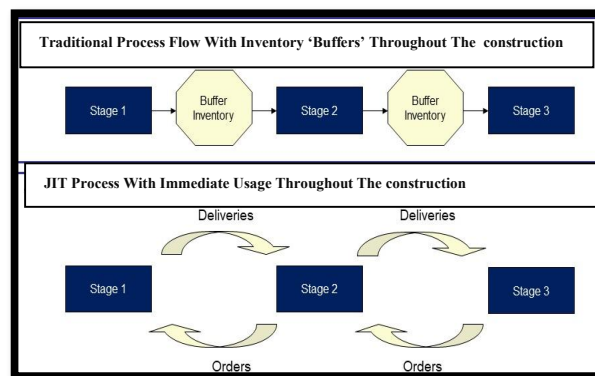


Fig.1 Shows concept of Conventional and JIT Method

#### Just-In-Time Method

A Just-In-Time inventory system is a management strategy that aligns material orders from suppliers directly with construction schedule. Implementing or integrating JIT into any construction organization is not easy it must be planned very cautiously. A key objective of JIT is to limit the consumption of resources with a view of optimize efficiency.

In a JIT environment, the process 'STOPS', when problems arise. JIT exposes any productivity problems, delays, process failure, etc and there is no buffer inventory, forces immediate and permanent solutions so that the problems do not re-appear. For e.g. any construction process or equipment failure becomes a major failure. The result is an immediate focus by technical, supervisory and management staff to identify and implement a solution. So the problems are permanently addressed and disappear. JIT will focus on strong relationship between customers and suppliers. As the JIT philosophy implies virtually no extra inventory, Customers, suppliers and the organization itself, need to rely on each other to be flexible, reliable and on time. Inventories are pulled through the process driven by demand from organization.

## III. CASE STUDY

In Pune five construction project specially construction of multistoried building were surveyed regarding their current material management process. This survey was questionnaire based survey. The survey was taken regarding to find out the acceptance of JIT, its benefits and limitations of implementation of JIT

Table 1. Analysis of surveyed construction companies for material management

Name of Project	Project 1	Project 2	Project 3	Project 4	Project 5
Type of project	Multistoried Residential	Multistoried Residential	Multistoried Residential	Multistoried Residential	Multistoried Residential
Is material management (MM) carried out?	Yes	Yes	Yes	Yes	Yes
Total cost of material (%)	70	60	70	60	60
Method adopted for MM Process	Manually	Software	Manually	Software	Software
Software used	-	ERP	-	ERP	ERP
For 1 type of work only 1 vendor has assigned	Yes	No	No	No	No
Inventory stock (no. of days)	12	15	10	12	15
Is any problem faced regarding order placing?	Yes	No	Yes	No	No
Responsible person for quality	Quality Engineer	Quality Engineer	Quality Engineer	Quality Engineer	Quality Engineer
Satisfaction of current MM used	Yes	No	No	No	Yes
Benefits /problem facing of current MM	Less cost but more manual error, more paper work, easily detail cannot find	Get details easily, gives current stock but problem of storage	Easy to understand, non technical person can operate but more manual error, easily cant update	Reduce wastage, easily find delay if any, technical person required to operate	Get details easily, easily update, but problem of storage
Awareness about JIT Concept	No	No	No	Yes	No
JIT concept used	No	No	No	Yes(for some material)	No
Delay in Project	Yes	Yes	Yes	Yes	Yes

#### IV. RESULTS

After completion of questionnaire survey, following outcome recommended regarding implementation of JIT method to compare with conventional method for the various construction projects.

##### Benefits of conventional method

- For small site and in any construction company if only one project is going on then it is beneficial
- Unskilled workers or non-technical person can carry out the work so skilled worker require less and it saves the cost of manpower.
- As traditional approach followed by many years so it is easy to understand.
- Suitable for remote areas
- No training is required. The traditional approach is flexible one to go with as it needs no prior knowledge and training to begin the project.

##### Disadvantages of conventional method

- On some site still all the work is done by manually without using any software. Due to this paper work increase, more chances of manual errors, easily

- details cannot find, difficult to find out the current stock of material, etc.
- Traditional approach is going to be slow as client isn't clear about the requirements. And changes can break the sequence and next activity will be stop until the previous activity isn't completed.
- Need more space and cost to store material
- Absence of central authority
- The time mismanagement issue can arise in traditional approach due to lack of mutual teamwork, unity and mutual development.
- The subcontractors or vendors are involved as individuals, not as a singular dynamic team so the lack of co-ordination can cause delay in project.

#### **Benefits of JIT method**

- Lower stock holding- It means reduction in storage space and Space constraints is the main issue in city area like pune. It also saves rent, insurance cost, Guarding & supervision cost etc.
- As stock is obtained only when it is needed, less working capital is tied up in stock
- There is less likelihood of stock perishing, become obsolete or out of date
- Minimizing waiting times and transport cost
- In JIT main focus is on quality of the final item and companies work to achieve 'first time right' for all goods. And everyone is responsible for quality and solving quality related problem so higher quality achieve.
- Minimum inventory at all stages of supply chain means lesser expiry and lesser wastage for the project.
- Close communication between all the parties involved in entire supply chain.

#### **Limitations Of JIT method**

- There is little-room for mistakes as minimal stock is kept for re-working faulty product.
- As awareness about JIT is very less so require support from Top-management is pure.
- JIT is difficult to implement in some construction like tunnel, substructure of bridge, etc. where there is large and sudden variation in quantity. Since the inventory levels are maintained at lower level
- JIT philosophy is achieved only when all the parties involved in the whole supply chain will work in great tandem and co-ordination.

### **V. CONCLUSION**

JIT is a philosophy which proposes to achieve the maximum with minimum inputs. This can be achieved only if all the parties involved in the entire ecosystem of supply chain will be committed to achieve this and work cohesively with great amount of co-ordination. Support from top management is also very essential. The whole organization must be committed to this philosophy.

JIT will need very careful planning and timely communication in the chain. So implementation of JIT technique is difficult in some condition like project located in remote areas, more variation in quantity, variation in design ,etc. JIT can be used in stereo type of construction like construction of MHADA housing scheme, Police quarter, CIDCO housing scheme, metro structure, bridge superstructure, etc.

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