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**ABSTRACT**

Material management plays very important role in any industry. Improper handling and managing materials on site during a construction process will influence the total project cost, time and the quality. JIT delivery is a service of frequent deliveries in work packs or task loads, 'pulled' just in time for the trade to perform the next task without incurring any delays. This can be done either through a CCC or individually by suppliers. JIT deliveries reduce or even eliminate the need for on-site storage of materials. Not only does this improve the site logistics but it reduces the risk of damage or loss of materials stored on-site as well as reducing congestion and the associated risks such as safety incidents.

**KEYWORDS:** Material Management, JIT(Just in time), Inventory process.

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**1. INTRODUCTION**

Materials management is an important function in order to improve productivity in construction projects. Materials management functions which include planning and material take off, vendor evaluation and selection, purchasing, expenditure, shipping, material receiving, warehousing and inventory, and material distribution. The result of improper handling and managing materials on site during a construction process will influence the total project cost, time and the quality. Now, a day's construction industry facing problem related to completion of project at time and cost as per requirement. Due to improper material management and lack of knowledge of implementation of inventory control technique, many construction industries are failing to implementation.

Just-in-Time (JIT) technique is one of the Japanese production strategy that improves the productivity by reducing the in process inventory. JIT means that in a flow process, the right parts needed in assembly reach the assembly line at the time they are needed and the amount needed. Just-In-Time was widely applied in Japan during the 1970's in the automotive and electronics industries. JIT may be described as an extension of the original concept of managing the material flow in industries to reduce the inventory levels at each stage.

**1.1 JIT Principle**

By using JIT principle, we can maintain quality of the entire project and increases efficiency of the workers. JIT principle says that inventories are not more important and should be considered as waste.

JIT can also be defined as producing the necessary units, with the required quality, in the necessary quantities, at the last safe moment.

**1.2 Need**

Today construction industry needs to minimize cost in addition to improve quality and on-time delivery. According to lean manufacturing, "inventory" is important factor of any construction firm that increases cost, reduces profitability and requires more working capital without adding any value to the customer and organization. Unfortunately, in our traditional accounting system, inventory plays role as an "asset" whereas it is a most expensive "liability".

**1.3 Objectives**

- To understand the detail philosophy of JIT for Construction project in India.
- To study the procedure of implementation of JIT (Just-In-Time).

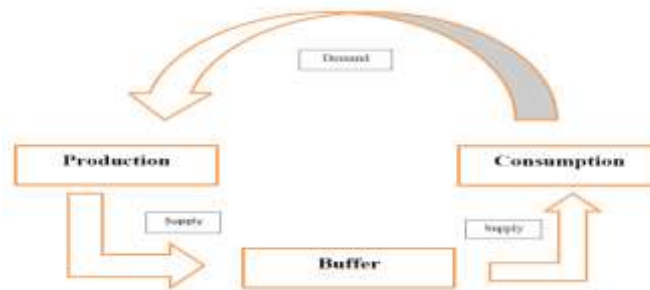
**2. LITERATURE SURVEY**

From the referred papers, it is understood that proper material management is one of the important thing in construction industry From the feasibility study of JIT(Just-In-Time) helps to overcome material delivery delays. The main aim of JIT materials management system in construction project is to optimize materials delivery timing and to minimize inventory quantities.

**3. METHODOLOGY**

**3.1 JIT Concept**

Just-in-time (JIT) is a stock control strategy used to increase efficiency and decrease waste thereby lowering inventory prices. Just in Time (JIT) production is a manufacturing philosophy which increases speed of production. 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.



*Fig No1: Shows JIT Concept Various Steps in Implementation of JIT*

JIT usually identifies various prominent types of waste to be eliminated:

- Waste from Overuse
- Transportation Waste
- Waste of waiting time
- Inventory Waste

**3.2 Implementation of JIT System:**

A JIT system is designed to expose errors and get them corrected rather than covering them up with inventory. JIT can be applied to many subsystems of a construction environment such as engineering design, setup time and lot size reduction, purchasing, flexibility, suppliers’ management, product development, inventory reduction at every stage, marketing, lead time reduction etc. among these purchasing has the cost saving. The purchasing goods represent 50-80% of the cost of goods sold for many companies, and in some industries such as textile industry, it accounts for more than 80% of the total cost. Usually, the purchasing department is expected to procure the right quantity of material of right quality at the right time, from the right source, and at the right cost. JIT system has been implemented in many industries of several countries such as United States, United Kingdom, Italy, Germany, and Korea etc. JIT is an approach of excellence in the entire organization, emphasizing on quality, by eliminating wastages to improve productivity. JIT is an inventory monitoring technique at each stage of the system starting from raw material to finished product to achieve the target in time that’s why we used JIT approach in construction industry in India.

**3.3 Differentiate between Traditional and JIT system:**

Sr. No	Traditional	JIT
1	Higher Quality is Expensive.	Higher quality save money and increase profit.
2	Some defects are acceptable.	No defects acceptable.
2	Buy from lowest bidder.	Buy quality and reliability.





3	Separate Inspection Department.	Build inspection into each phase of production.
4	Quality control department is responsible for insuring quality.	Everyone is responsible for quality.
5	Quality Engineering department is Responsible for Solving quality problems.	Everyone is Responsible for Solving quality problems.

### 3.4 Potential Benefits of JIT

The positive results from JIT application in the construction industry include:

- (1) Enhancing the competitive advantage of firms in terms of consistently and continually meeting customer requirements
- (2) Improving quality of construction materials and components
- (3) Productivity enhancement
- (4) Cost reduction in terms of minimizing the levels of inventory
- (5) Improving relationships with suppliers
- (6) Completing work ahead of schedule
- (7) Improving the tidiness of construction sites
- (8) Eliminating site congestion and inconveniences caused to neighborhoods.

### 3.5 Barriers to Adopt Just-In-Time Practices in Construction Industry

Despite the fact that JIT as theoretical idea appears to be wonderful, there are some obstructions in getting this idea work in all actuality and get JIT implemented appropriately. Some of the barriers that may arrive while adopting the JIT technique are listed below:

- The JIT framework must work effectively and worker must carry out their activity right.
- JIT depends on participation and trusts between individuals, specialists, supervisors, providers, clients and so on.
- The idea of JIT must be seen completely in a similar importance by all concerned and after that endeavour usage.
- Implementing JIT is frequently extremely costly, when the preparation, and to give training to workers i.e. To prepare skilled labours .
- Problems with site access that include blockage, congestion within the site, no room for parking the long vehicle
- Incorrect type of material delivered
- Poor communication, Receiving, handling and storage of unused materials

## 4. APPLICATION OF JIT IN CONSTRUCTION PROJECT

Much had been discussed on raising the productivity level of the construction industry which consistently lagged behind other sectors of the economy. The use of buildable designs was singled out as a means to improve productivity. In so far as construction management is concerned, the Just-In-Time (JIT) philosophy can be applied for logistics management on worksites to help raise productivity levels. The JIT philosophy originates from the manufacturing sector. It helps to smoothen the production process through the efficient handling of materials, i.e. by providing the right materials, in the right quantities and quality, just in time for production. Given the very different conditions in the construction setting, it is inevitable that modifications have to be made to some of the JIT principles where application is concerned.

Nevertheless, both the manufacturing and construction industries require active movement of materials from the suppliers to the production area in both the factory and the worksite. With the JIT management system in place, materials may be delivered to site on the actual day of use or just the day before.

### 4.1 Study of causes of delay in material delivery on site

Problem: Improper Communication between site engineer, plant supervisor and vendor we observed improper communication between plant supervisor and engineer during Construction Work. This is a first reason about late material delivery. We suggest to engineer and vendor, prepare plan and according to that communicate each other. Second Problem is poor fleet management. There is no proper special staff for fleet management.



Managers not maintain record of inspection and maintains of fleet. Manager not careful about fuel purchasing system. We suggest to company for preparation of plan for fleet replacement. Company must have proper fuel

purchasing system. Third problem is poor planning of material delivery. We suggest to company for vendor selection. Prepare monthly procurement plan. We submit JIT plan to company. JIT Plan helps to company to reduce cost of construction.

#### 4.2 Problems in Just-In-Time Practices

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#### 4.2 Recommendation

- There should be a centralised material management team co-ordination between the site and the organization.
- Proper control, tracking and monitoring of the system is required.
- Awareness and accountability should be created within the organization
- By implementing the JIT we can eliminate the waste and also reduces inventory problem.
- On observing that the in-order time required for transfer of material from one place to another place is more so we can suggest to use inside material stock to reduce the time
- The performance factor of activity is very less to affect efficiency so reduces non value added activity so the efficiency is increases
- JIT implementation improves competitive performance by lowering inventory levels and reducing quality costs and non-value added activities.

### 5. CONCLUSION

In this study ,the reasons of failure of actual material management are studied. It is seen that most of the construction projects fails due to improper planning of material management also extents due to improper knowledge of material management, due to wrong selection of vendors etc construction project delays and increase the cost of construction. The concept, principle and requirement of JIT studied from literature review.

In this study JIT gives new directions of planning and performing activities in construction project therefore JIT is approach that combines difficult objectives of low cost, less requirement for material stock, high quality and delivery dependability. In short JIT is a system that produces the required items in the time and the quantities needed. JIT gives better performance than traditional method which affects the life cycle cost of the entire project.

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