

“An Investigation of JIT (Just in time) Approach in Inventory Control of Ongoing Construction Project”

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Abstract - The Just in Time (JIT) methodology represents a production strategy designed to optimize operational efficiency through demand-driven manufacturing. This approach operates under the principle of $\langle \text{Industry manufacturing the product only which is required, when it is required \& in how much amount it is required} \rangle$, a system prioritizing real-time client demand over speculative output. Fundamentally, JIT aligns production volumes with market needs while maintaining quality standards and minimizing surplus. Strategic resource allocation enables industries to deploy assets without operational bottlenecks, though implementation requires meticulous coordination.

Inventory management emerges as a critical leverage point for enhancing construction productivity. The process encompasses supplier evaluation protocols, cost-optimized procurement cycles, and streamlined material distribution networks. A persistent challenge. While traditional accounting frameworks classify inventory as an $\langle \text{asset} \rangle$, lean manufacturing principles expose its hidden costs: reduced profitability, inflated working capital requirements, and limited value generation across organizational stakeholders. Toyota Motor Corporation identified this operational reality, pioneering their $\langle \text{Just-In-Time} \rangle$ system to achieve radical inventory reduction while maintaining production continuity.

Key Words: Just In Time, Inventory Control, Conventional Method, MSP Analysis

1. INTRODUCTION

Simply in Time (JIT) approach is a manufacturing method which is used for completing assignment within time. JIT method is, “company manufacturing focusing on what is exactly required in how an entire lot amount & whilst it’s far to be required”. The enterprise agency manufacturing that is customers demand. If we describe truly in time then it’s miles a way for manufacturing the vital devices, with appropriate in required quantities. It method that commercial enterprise corporation could make do with their very very own assets and allocate them without any trouble. simply in Time (JIT) method is a manufacturing method which is used for completing project inside time. JIT

approach is, “employer manufacturing specializing in what is exactly required in how plenty amount & whilst it’s miles to be required”. The employer production that is clients call for. If we describe simply in time then it’s miles a method for production the critical items, with suitable great, in required quantities. It implies that business enterprise ought to make do with their personal belongings and allocate them without any hassle.

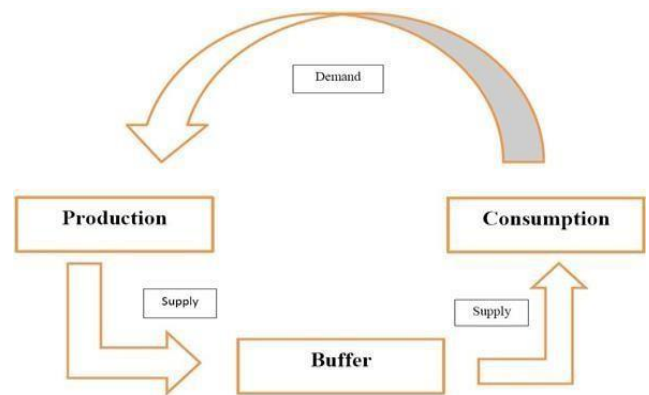


Chart-1

JIT generally identifies four types of waste to be reduced:

- i. Waste because of Overuse
- ii. Waste in the transportation
- iii. Waste of ideal time
- iv. Stock Waste

1.1 Potential Benefits of JIT

The positive results of JIT application in the development industry include:

- Strengthening the competitive advantage of companies so that they reliably and permanently meet the requirements of the Customer.
- Improving the character of construction materials and parts.

- Cost reduction in terms of inventory minimization.
- Improving connections with suppliers
- Completion of work ahead of schedule
- Improving the organization of construction sites

1.2 Scope of Study

In this examine, the focus is on small and medium scale creation initiatives which face price overruns due to inefficient stock control and want up gradation of their procedure. A case look at will examine tactics. extraordinary parameters on the equal web page can be analyzed and reviewed to see if JIT approach is better than conventional method for stock control in creation industry. The conventional technique to cloth control has modified over the last three decades. JIT is being carried out in Indian construction industry. fabric control and inventory manipulate are becoming more and more famous inside the construction industry. The performance of JIT become not improved despite the equal production mission being carried and implemented. The take a look at on JIT is carried out to study the method of implementation, understand and find out the troubles, and provide idea to remedy them.

1.3 Problem statement

The traditional method to the fabric management system has been converting in the last 3 many years. The JIT (simply-In-Time) philosophy is being implemented in the Indian construction industry.

presently, diverse techniques for cloth control and stock management are being applied inside the production industry. A comparable construction assignment become completed and implemented through JIT, however the performance of JIT still did not improve in keeping with the necessities of the studied literature. consequently, this study on JIT is carried out to have a look at the implementation method, apprehend and find out the issues and offer guidelines to solve them.

2. OBJECTIVES OF THE STUDY:

- To understand the detail literature of JIT for commercial construction project.
- To study procedure of implementation of JIT.
- To identify the problems in implementation of JIT.
- To carry out comparative analysis between conventional approach and JIT approach for inventory by MSP software.

3. METHODOLOGY:

Following methodology will be adopted – PHASE I

- To study literature review.
- Collection of data from ongoing commercial construction projects.
- Apply ABC analysis for the material from ongoing commercial construction projects.

PHASE II

- Identifying the risk factors in construction project.
- Prepare schedule of risk factors for optimization.
- Tracking & controlling of project by MSP software.
- Comparative analysis of collected data by JIT method.
- Recommendation & Conclusion.

3.1 Study of literature reiew

Shubham Dharmadhikari, Prof. V Payghan (November 2022) this text explains that all economic development initiatives want to adapt to modifications in the economy over the years. Product management specializes in optimizing the product to make sure inc reased efficiency in the course of improvement. unluckily, in our t r aditional gadget, equity is part of funding but it is the r iskies. Small and mediumsized companies face troubles d ue to loss of get entry to to software like enterprise Asset manage ment. it's far essential to use a polishing stone often to s tay aggressive. just-in-time (JIT) is one of the sports which could improve inventory management with out requiring a big investment. Yogesh C. Suthar, MD. J.R. Pitroda (2022)

This text suggests that simply-in time (JIT) methods are very promising for monitoring precast concrete go with the flow thru precast homes and precast concret e. In wellknown, in growing nations, the JIT records ma nagement approach seems to be better than the JIC approach i n lowering charges and growing performance. female. Pradnya R. Pingale and Dr. Madhav B. Kumthekar (may also 2022) The aut hor says in this text that the development industry in India has been considered relatively competitive and dynamic in rece nt years. the construction enterprise is trying to enforce ne w business techniques to continue to exist inside the competitive marketplace. C ompanies need to try to provide high-quality merchandise, low prices tha t attain clients in the shortest feasible time. this is where new techniques come into play that goals to lessen costs with the aid of el iminating pointless greater paintings.

Mohamed Hussein, Tarek Zayed (2021) according to this paper, Modular included construction (MiC) is a innovative construction approach. but, the logistics management of MiC has usually been barrier a prime to the broader adoption of MiC. however, this venture may be tackled by the software of lean techniques, specifically, just-intime (JIT). numerous studies have recognized and evaluated the essential factors (CFs) required to implement JIT, herefore, this studies, for the first time, affords a systematic assessment and meta-analysis of those CFs. The systematic evaluation identifies 42 CFs. To in addition provide a synthesis evaluation of previous studies, a meta-analysis method is used. Mali Pritam et.al (2020) This paper explains that, fabric control performs very crucial position in any industry. wrong dealing with and handling substances on website online at some point of a construction method will affect the total assignment value, time and the first-rate. JIT transport is a carrier of common deliveries in work packs or project loads, 'pulled' simply in time for the change to perform the next mission without incurring any delays. this will be done either through a for my part by using providers. JIT deliveries lessen or maybe dispose of the need for on-web site storage of substances. no longer handiest does this improve the site logistics however it reduces the hazard of harm or lack of substances stored on-website online in addition to lowering congestion and the related dangers such as safety incidents.

3.2 Collection of data from ongoing commercial construction projects.

In this project we have considered case studies for detailed understanding. We go for case study because to understand the procurement process of material, planning and scheduling of different activities for construction project. As for considered construction site optimize time by using different software as well as different techniques in it.

3.3 Identifying the risk factors in construction project

From the data collected from construction site about executing different activities with their quantity of material and resources required. Here we analyze data with reference of theoretical concepts and finding out the extra resources wastage for a particular activity.

- Activity considered for this work:

- 1)Internal Plasterwork
- 2)External Plasterwork
- 3)Brickwork
- 4)Flooring work
- 5)RCC work

3.4 Prepare schedule of risk factors for optimization

Use the Analytical Hierarchy Process (AHP) to evaluate and choose the most suitable supplier. Prepare a material procurement plan and share it with both the site team and suppliers. Ensure clear communication between the site engineer, supplier, and plant supervisor to maintain a seamless workflow.

3.5 Comparative analysis of collected data by JIT method.

On this web site MSP software program is being applied for the planning and scheduling the sports of the project. on this website the statistics offer to the MSP are the paintings to be done, their time, start and finish dates and the paintings are being linked which offers idea of doing work at the specific time.

Thusly MSP affords a clear concept about the work to be completed and the assets required for the execution of the paintings. facts offers through the MSP can be utilized for proper making plans, organizing and managing activities and assets to obtain a goal in given constraints of duration and price range. appropriate management may be performed at some stage in challenge to keep away from failure in reaching target in given detailed time. MSP can deal massive and complex task and satisfy the demand of present mission. [7]

MSP was utilized to devise and agenda the paintings and arrange consequently but data about property changed into no longer given to the software. Henceforth there was no statistics obtained about assets and cost required for the execution of the paintings. So not getting the idea about the assets on the site resulted in:

- 1) Improper arrangement, scheduling and organizing of assets.
- 2) Improper management of funds and resources.
- 3) Resulting in delay in supply.
- 4) Shortfall in quantities finished.
- 5) Emergency supply condition in next month resulting in extra expenditure.

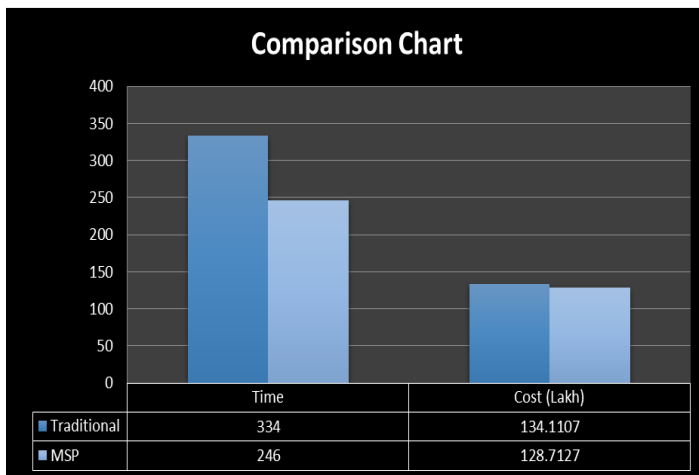
4. RESULT:

By applying these optimization techniques in MSP, the following improvements are observed:

- Reduction in project duration: Strategic crashing and fast-tracking minimize total completion time.
- Cost savings: Avoiding unnecessary delays and optimizing resource allocation lowers overall expenses.

- Better risk management: Simulation techniques provide insights into potential delays, enabling proactive decision-making.
- Enhanced productivity: Efficient scheduling reduces idle time and improves workflow coordination.

Integrating optimization techniques within MSP significantly enhances project performance by reducing both duration and cost. By leveraging time-cost tradeoffs, resource leveling, and algorithm-based scheduling, construction projects can be executed more efficiently, leading to increased profitability and timely completion.



Graph no 1: Comparison with traditional and MSP considered work for study

● Comparison Chart

The graph presents a comparison between the Traditional project scheduling method and the MSP (Microsoft Project) optimized method in terms of time (days) and cost (Lakh INR).

● Time Reduction:

- The project duration using the Traditional method is 334 days.
- The optimized MSP approach reduces the duration to 246 days.
- This results in a 26.35% decrease in project duration (88 days saved).

● Cost Reduction:

- The total project cost using the Traditional method is 134.1107 Lakh INR.
- The cost with the MSP optimization is 128.7127 Lakh INR.

- This results in a 4% cost savings of 5.398 Lakh INR.

● Summary: -

By implementing MSP with optimization techniques, the project achieves significant time savings (26.35%) and cost reduction (4%), making it a more efficient and cost-effective approach compared to traditional scheduling methods. If this MSP planning and scheduling will continue from start to end project then it will save 192 days and 16.80 lakhs approximately throughout the project.

5. CONCLUSION:

- The study identifies improper material management and lack of inventory knowledge as major reasons for construction project failures, leading to delays and cost overruns.
- Poor planning in material delivery results in wastage, and incorrect ordering causes quality and dimension mismatches, emphasizing the need for a proper procurement plan.
- Various project planning software are available, and this study utilized MSP software for effective scheduling and management.
- Data was collected over three weeks for four activities—Brickwork, Internal Plastering, External Plastering, and Tile Flooring—where cost and time were optimized using MSP.
- MSP software helps in efficient project planning and scheduling, minimizing time, cost, and material wastage while ensuring smooth workflow. Supplier selection is also crucial for effective material management.

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