

JUST IN TIME CONCEPT USED IN CONSTRUCTION PROJECT

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Abstract - The building industry in recent times is seen to be highly competitive and dynamic. To remain with the world market of building industry we need to adopt new approaches or new system. This is where the importance of new concept comes into play like Just-in-time. This thesis addresses the Just-in-time (JIT) concept used in housing project. Initially, a framework is established for this study through the presentation of brief history and marketing theories. Then, through literature review, questionnaire of four different phases has been made, which are in turn later used to compare the data collected from the industry. Data are collected via surveys of general contractors. Results show that companies which satisfied majority of the four characteristics has better chance of success. Further conclusions are discussed and future recommendations are also presented.

Key Words: Housing project, Just-in-time, Building industry, inventory, Quality.

1. INTRODUCTION

The building industry are particularly project based, and famous for not achieving maximum productivity, and for the industry that consistently experiences challenges with keeping time plans because of postponements during the development time frame. Keeping this in mind the construction management, the presentation of the Just-in-time idea is regularly favorable, while dealing with the coordination of the construction materials and workforce on the building destinations.

The Just-in-time reasoning was initially produced for the assembling business. It was started in japan in the mid-1950 and created in the gracefully chain region by Taichi ohno and his kindred specialist at Toyota.

The Just-in-time is a framework that delivers the necessary thing at the opportune time and in the correct amounts required. Without a moment to spare idea is to lessen or at last destroy variety and waste. In our structure industry the waste is pausing, putting away stock and moving materials.

There is a huge distinction in how Just-in-time is convey outed in the building business contrasted with the assembling business. This is on the grounds that development is a might be kind of creation, which may all the more intently be looked like with advancement, than with assembling. If not thinking about the business of

'sequential construction system lodging'. By and large, there is a far more prominent unpredictability and vulnerability in development. Without a moment to spare is an idea from the lean way of thinking, and the objective of the Just-in-time idea is to decrease, or at last annihilate, varieties and waste. In the structure business this waste is pausing, putting away stock and moving materials.

1.1 OBJECTIVE

To investigate the appropriateness of JUST-IN-TIME and current circumstances on the construction site by poll survey.

To realize and recognize obstructions and challenges that might be experienced in the carry outation of Just-in-time approach.

To set up the survey to check an appropriateness of the Just-in Time approach in housing business.

1.2 NEED FOR STUDY

The need of this examination is to realize the degree of awareness and to discover key issues to carry out Just-in-time approach ideas in the building business.

1.3 SCOPE OF WORK

This study was done on the different organizations of Ahmedabad region. The study will focus on identifying different barriers and difficulties in carry outation of Just-in-time approach in housing project.

1.4 RESEARCH METHODOLOGY

1.4.1 Literature Review

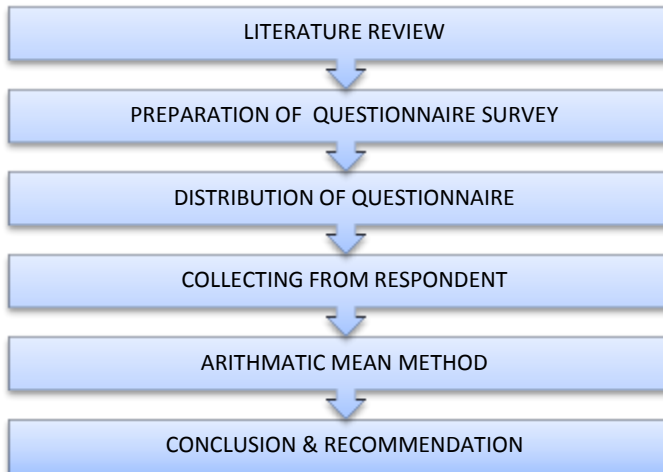
Literature review has been done from previously published research papers on this topic from various international journals as well as relevant books and researched thesis to understand previous work done on this kind of project.

1.4.2 Data Collection

Data collection has been carried out by questionnaire survey from various executives who have worked in similar kind of projects and within similar region.

1.4.3 Data Analysis

Data analysis has been done from collected data by qualitative analysis and quantitative analysis as well as arithmetic mean analysis so that proper importance index to factor can be achieved.



Flow-Chart Research Methodology

2. DATA COLLECTION

2.1 General

This chapter describes the background of the quantitative data collection exercise, and presents the main steps taken for the collection of data required for the study whereas the methodology chapter describes the steps taken in designing

The questionnaire, this section provides in account of the execution of the methodology.

2.2 Questionnaire Design

The questionnaire is made by seeing the relative literatures in the area of Just in time concept used in Construction Company. The questionnaire was validated with experts for clarity, ease of usage, and value of the facts that could be gathered.

2.3 Data Measurement

For measuring the process, Scale is used to rank the each factors. This range from 1 to 5.

Table: 1 – Rating Scale

SCALE	DESCRIPTON
1	Very low

2	Low
3	Moderate
4	High
5	Very high

2.4 Sample Size

Total of 65 questionnaires, consisting of 74 questionnaires in Construction Company, were sent out to employer of small construction companies. This is the sample size selected for the all of the employer of all construction companies, specifically engineer, specialist owner and site engineer and purchases department.

Table: 2 – Percentage of Valid Respondent

TOTAL NO. OF QUESTIONNAI RES SENT	TOTAL NO. OF QUESTIONNAI RES RECEIVED	NUMBER OF VALID RESPOND ERS	RESPON SE RATE
65	43	43	66 %

2.5 Just in time concept

Just In Time could be a strategy for forwarding material or explicit labor or qualities at the exact second where it's required, reducing nearby inventories and inefficient worker hours. Companies utilize this inventory procedure to expand effectiveness and decrease squander by receiving merchandise just as they have them for the gathering approach, which diminishes inventory costs. This strategy expects makers to conjecture request precisely. -

3. DATA ANALYSIS

3.1 General

Here, after the data collection by questionnaire from the organization who were happy to develop their organization for their, the investigation is to be finished. In information assortment, the organization's assessment gathered through inquiry rattled off in survey from. Here information examination is completed with the information gathered. Gathered information is contrasted and one another and level of reactions are discovered. Information examination is done to decide the choices picked by the organization.

3.2 Arithmetic mean

The arithmetic mean is the least difficult and most broadly utilized proportion of a mean, or normal. It just requires taking the entirety of an aggregate of numbers, at that point separating that whole by the include of the numbers utilized in the arrangement.

$$\text{Arithmetic mean} = \frac{A_1 + A_2 + A_3 + \dots + A_n}{N}$$

It can also be denoted as: Arithmetic mean = $\frac{\sum A_n}{N}$

3.3 Analysis of factors

FACTOR AFFECTING THE PERFOEMANCE OF PROJECT	MEAN	RANK
FACTORS IDENTIFIED WITH PROJECT		
Type of project	3.395	6
Project size	3.325	15
Location of project	3.325	15
Capital cost	3.023	30
Quality assurance	3.627	1
Contractor past experience	3.162	25
FACTORS IDENTIFIED WITH CLIENTS		
Clients nature	2.906	35
Clients reputation	2.883	36
Clients experience in procurement of materials	3.023	30
FACTORS IDENTIFIED WITH COST		
Price rivalry	3.348	8
Cost of design	3.395	6

Consultant charges	3.348	8
Material cost	3.441	5
Labour cost	3.348	8
FACTORS IDENTIFIED WITH TIME		
Less design time	2.976	33
Delay in getting environmental approval	3.023	30
Delay in the venture competition time	3.279	19
CONSTRUCTION APPROACH AND ITS EFFICIENCY		
Increase in price of material	3.348	8
Disputes between labours	2.720	37
Chang in order of construction activity	3.046	29
Lack of resource	3.069	27
Material procured without planning	3.069	27
Delay in approval	3.116	26
Data related to inventory	3.186	23
PROBLEM ASSOCIATED WITH MATERIALS		
Lack of conformances to	3.186	23

requirements		
Damaged materials	3.465	4
Incorrect type & size of material deliver	3.488	3
CRITERIA TO MAINTAIN STOCK FOR MATERIALS		
availability of fund	3.325	15
Market condition	3.209	22
Site location	3.279	19
Climatic condition	2.976	33
Project cost	3.348	8
Do you prefer JIT	3.534	2
Need for stock management	3.279	19
Maintain safety in storing	3.348	8
RELATIONSHIP WITH SUPPLIER		
Vendor selection	3.302	18
Distance from project site to vendor shop	3.348	8

Table: 3 – Factors affecting the performance of project

This piece of survey comprises of eight principle factors which influences the exhibition and effectiveness of housing ventures. 43 respondents give their response to this question. By the help of arithmetic mean method analyses the answer and given the ranking based on that. It clearly shows that top fours factors are quality assurance, preference of Just-in-time, incorrect type & size of material deliver and damage materials.

Construction delay cause	MEAN	RANK
OWNER		
Finance & payments of finished work	2.906	13

Slow decision by owners	2.930	12
Unreal forced contract duration	2.906	13
CONSULTANT		
Preparation & acceptance for drawings	3.372	5
Quality control & Quality assurance	3.604	2
CONTRACTOR		
Mistakes during construction	2.860	15
Improper construction methods	3.302	6
Inadequate contractor experience	3.255	7
MATERIAL		
Quality of material	3.860	1
Material shortage	3.511	3
Barter system for material vendor	3.046	10
LABOUR		
Labour supply	3.139	8
Labour productivity	3.418	4
Equipment availability	3	11
CONTRACT		
Contract mistakes	3.069	9
Major disputes & negotiations	2.697	16
CONTRACTUAL RELATIONSHIPS		
Inappropriate overall firm structure connecting all parties of the Project	2.465	18
Absence of communications between parties	2.558	17

Table: 4 – Construction delay cause

This piece of survey comprises of seven principles which influences the construction delay. 43 respondents give response to this question. By the help of arithmetic mean method analyst the answer and given the ranking based on that. It clearly shows that top fours delay cause are quality of material, quality control and quality assurance, material shortages, labour productivity.

So it indicates that material shortages are one of the important factors.

FACTOR	MEAN	RANK
Affecting factors to the applicability of Just-in Time		
The different of material suppliers and the competitive Cost	3.139	4
Facilitating the development of projects in the most Proper way.	3	5
Limiting the stock cost.	3.395	2

Just-in-Time will cause and overall decrease in delays.	3.697	1
Just-in-Time & Lean Construction permits arrangement for Change and ensure that no excessive wastage happens.	3.232	3
Affecting factors the cannot be applicability of Just-in Time		
Postpones due to bureaucracy and a many approval by municipality and decision making approach time	3.116	5
Attitude of stakeholders	3.651	1
Unavailability of materials in near market and risk of postponement of conveying the materials	3.441	3
Contractors do not want to take risk in terms of shortage Of materials.	3.325	4
To avoid price inflation	3.465	2

Table: 5 – Factors affecting in implementation of just in time for construction project

This part of questionnaire is for the some of the factors that can affect while the carry outation of Just-in-time for housing project. 43 respondents give response to this question. By the help of arithmetic mean method analyses the answer and given the ranking based on that. In this questionnaire part given some probable reason of whether Just-in-time can be applicable or not. It clearly shows that top two reasons behind it applicable are minimizing the inventory cost and Just-in-Time will help in decreasing of delays. And on the another hand top two reasons behind its not applicable are mentality of stakeholders and to avoid price inflation

FACTOR	MEAN	RANK
CRUCIAL FACTORS FOR CARRY OUTING JUST-IN-TIME IN THE FIRM		
Vendor Relationship with Top Management	3.139	5
Labor Cooperation	3.069	8
Top management commitment	3.139	5
Level of training to Employees	3.116	7
Level of Material handling	3.720	1

Preventive maintenance	3.232	4
Supply chain Management	3.372	2
Contract with supplier	3.255	3

Table: 6 –Crucial Factors for implementing just in time in the firm

This part of questionnaire is for asking which of the factors are most crucial in any construction firm. 43 respondents give response to this question. By the help of arithmetic mean method analyses the answer and given the ranking based on that. Most of the respondent feels that there are three crucial factors for the carry outation of the Just-in-time for the housing project which are level of material handling, supply chain management, contract with supplier.

3.4 Just in time implementation process

One of the significant targets in actualizing a JIT System is to accomplish a shared objective of the entire organization. First step is recognizable proof of material conveyance issue in organization and give answer for organization. Second step is Material Quantity Calculation. ABC, HML, VED, SDE Investigation is finished. Examination assists with choosing material for JIT Application. Third Step is planning of JIT plan Gear efficiency determined. Discover number of days required to finish work. Plan incorporates date, spot of material conveyance, time and no. of gear required. Fourth step is seller choice. Explanatory Various leveled Process is utilized for seller choice. At that point material obtainment plan arranged. JIT Plan Submit to plant and merchant. Keep up legitimate correspondence between site architects, merchant and plant director. The execution of JIT in development requires responsibility from staff and group associated with the development in wording that all gatherings from the arranging and site ought to team up and take an interest in the dynamic procedure. The fruitful execution of JIT is reliant on the providers' adaptability, clients' steadiness, absolute administration and representative duty just as collaboration.

Table: 11 – Overcome Statement Statics Analysis

4. CONCLUSION

This research work helped us to find out the factors that affect the performance of project, construction delay cause. It also helped in identifying the probable reason of Just-in-time applicability and cannot be applicability. By this research work identified the some of the crucial factors that need in good condition in the firm so that Just-in-time easily applied or best chance to successfully carry

outation in the construction firm. It can also be said that if the vendor relationship, supply chain management and level of material handling are not good then high chance of failing the Just-in-time concept. In this research work I also found out that very few respondents know about Just-in-time concept and it can also applicable in building industry. In some of the project the material cost is around 50 % so Just-in-time concept is very useful in reducing that. JIT system has probable to address low quality issues and low profitability. the implementation of JIT on construction seems unclear because any application of any method not only just all about take the whole method from other industry and then simplify implement it into the construction industry.

Some of the benefits of JIT system:

Help in improvement of customer supplier relationship.
It improves profit margin.
Help in competitive to the world.
It improves team work.
It can reduce inventory cost and space requirement at site.
It also helps in improve quality and increased productivity.
It can reduce labour requirement and paper work.

RECOMMENDATION

Just-in-time has the probable to extend the productivity, quality and organizational effectiveness of Indian construction industries while its some elements are slightly difficult to carry out in current system of industries. To gain the the benefits of Just-in-time, Indian construction industries must willing to modify their procedures and operations. The probable benefits of Just- in-time for the Indian construction industries are not in doubt. Although the Indian construction industries need to design the right strategy for carry outing the Just-in-time in Indian building industry.

REFERENCES

- [1] A Review on Concept, Applicability and Implementation of Just In-Time Technique in Construction industry International Journal of Engineering Science Invention (IJESI)
- [2] NEED FOR JIT IMPLEMENTATION:MATERIAL SHORTAGE PROBLEMS AS A CAUSE OF DELAY IN CONSTRUCTION PROJECTS IN EGYPT International Journal of Civil Engineering and Technology (IJCIET)
- [3] Analysis Of Effect Of Just-in-time (JIT) Increase In Performance Timing Of Gathering Station Construction Project In Tarakan, East

Kalimantan, Indonesia Imperial Journal of Interdisciplinary Research (IJIR)

- [4] Feasibility study of Just-in-time inventory management on Construction project International Research Journal of Engineering and Technology (IRJET)
- [5] The Applicability of Just-In-Time in United Arab Emirates Construction projects Journal of Emerging Trends in Engineering and Applied Sciences (JETEAS)
- [6] Why Indian Industries Fail To Implement JIT - An Analysis. International Journal of Engineering Research & Technology (IJERT)
- [7] The Application of the Just-in-Time Philosophy in the Chinese Construction industry Journal of Construction in Developing Countries.
- [8] JIT System: Concepts, Benefits and Motivation in Indian Industries International Journal of Medical and Biomedical Studies (IJMBS)
- [9] JIT Practices in Indian context: A Survey. Journal of scientific and Industrial research
- [10] Just-In-Time Logistics in the Supply of Building Materials International Conference on International Conference on Construction Industry Development