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Study of Supply Chain Management in Construction Project

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ABSTRACT:

The supply chain management is supplying of goods in response to demand. by reducing the quantity of labor needed to construct high-rise buildings over traffic or at high elevations. Construction of ATM buildings will lead to quicker project completion and less delays. Fast-track building systems use ATM base components to swiftly assemble a structure. The project could be quite complex, requiring a wide range of skills and a myriad of resources, or it could have a simple goal that doesn't require many people or a lot of money. All of us manage projects, though, is the truth. Therefore, the focus of managing the project should be on effective and efficient project execution rather than just execution itself. Traditional methods are used by Indian construction companies to develop projects, which can be labor- intensive and wasteful. Conventional techniques are equally perplexing and time-consuming. Through a case study on a single wing of a project finished in Pune, Maharashtra, India, the proposed work will give them the chance to clearly see the differences between advanced construction techniques and traditional planning techniques that speed up construction and make the project cost effective with proper planning. We looked for international journal articles to find out about various traits that show effective project planning and execution, different tactics taken, and corrective measures taken.

Keywords: Supply Chain Management, Advance Technique Method, Conventional Method, Critical Path method.

Introduction:

The Supply Chain Management Program unifies purchasing, transportation, manufacturing processes, and physical distribution into one cohesive program. Subsequently, effective supply chain management unifies and synchronizes all of these activities into one. It includes and binds together every link in the chain. These partners encompass not just internal departments but also third -party organizations, transporters, distributors, and information system providers. The suggested work focuses on supply chain management (SCM) in building projects. To study the work of SCM in construction work. To implement the SCM in a construction project in accordance with planning. To research and compare, taking into account time and cost, the advantages of the Conventional Method (CM) and the Advance Technique Method (ATM). Lastly, suggest a mechanism that can be used to sources of execution and real- world demand. This work's scope is fundamentally significant for any G+ building. For both ATM and traditional construction, the overall cost and length for the two-story residential building have been established. In addition, we knew the advantages and disadvantages of both conventional and advanced construction because of a survey conducted in organizations that were similar to ours. The investigation showed a considerable difference in costs across the alternatives, with the ATM being far more costly than traditional methods on this kind of single property. Construction of ATMs is 15–18% more expensive than conventional construction of single-story homes.

Supply chain management (SCM) is required to get rid of these inefficiencies and accomplish complete building process integration. SCM is a way to integrate design, construction, and operation in a horizontal and vertical manner to maximize opportunities for value addition and reduce overall costs. This application requires a significant mental shift from clients, partners, consultants, the lead contractor, and other team members for mutual benefit.

Three categories are connected to SCM flows.

Material flow: There is a physical product flow along the supply chain from suppliers to customers, as well as a reverse flow through product return, recycling, and disposal.

Information flow: includes sending orders, generating delivery status reports, and forecasting demand

Cash-flow: information includes ownership relationships, consignment details, payment schedules, and business data.

Interviewing the site's project manager allowed researchers to learn more about the layout of the site, the order in which construction jobs were completed, how long they took to complete, how they were connected, the total construction timeframe, the resources used, and the significant milestones. In order to determine the project's length, the investigation also looked at the project's Bill of Quantities and documented the tasks and quantities. A residential building was chosen as a comparison, and MS Project schedules were made for the Conventional Method (CM) and the Advanced Technique Method (ATM), two distinct construction approaches. The overall project length for each construction technique was determined by comparing the completion times for each construction method using MS Project's Critical Path method, after the project durations were acquired from the relevant companies.

Case Study - 1	Case Study-2	Case Study-3
• Name of Project: ABC • Side Margins: Front Margin 3.2M, Rear Margin 3.4M. • No. of Stories: G+6 • No. of Flats: 24 Flats • Area of Flat (1BHK or 2BHK): 621 and 761 Sq. Ft. • Location-Plot No. Survey No.: CST 104/2/140/141 Pandharpur, Dist.-Solapur. • Software used at site: NA • No. of Labor: NA • Overall cost of Project: 2,59,06,020 INR • Management team: NA • decision Support System: NA	• Name of Project: PQR • Side Margins: Front Margin 3M, Rear Margin 1M. • No. of Stories: G+5 • No. of Flats: 32 Flats • Area of Flat (1BHK or 2BHK): 570 and 810 Sq. Ft. • Location-Plot No. Survey No.: 20/21, CST 1511 • Software used at site: NA • No. of Labour: Given in Table 6.1 • Overall cost of Project: 4,57,06,020 INR • Management team: NA • decision Support System: NA	• Name of Project: JXYZ • Side Margins: Front Margin 3M, Rear Margin 3M. • No. of Stories: G+5 • No. of Flats: 36 Flats • Area of Flat (1BHK or 2BHK): 610 and 870 Sq. Ft. • Location-Plot No. Survey No.: 624/11 • Software used at site: MSP • No. of Labour: Given in Table 6.2 • Overall cost of Project: 5,25,91,543INR • Management team: . Site Engineer . Supervisor . Organiser . Design . Planner

Methodology:

Sample Question survey for the data collection

1. One reason for avoiding using the Advance Technique Method on smaller projects is.
2. How long does the slab cycle take at your location?
3. What issues do you have with the supplies being supplied to your site?
4. Is the content easily accessible?
5. Is the traditional manner of methodology preferable on your website?

Photos of site Visit.

Advanced Method Technique:

Buildings constructed using the ATM (Advance Technique Method) idea have the majority of their structural components fabricated in off-site plants, offsite from the construction site, and standardized. After that, these precast pieces are lifted into place and put together to create the finished structure. Some supplies are supplied by outside sources in order to make this building process possible, and big trucks are needed for transportation. In order to avoid any damage during the transfer of these units, it is crucial that the roads are in good shape. There are two benefits to fully implementing the Advance Technique Method building: faster construction and lower costs.

India's Advanced Technique Method:

There are a number of reasons behind the Indian market's quick adoption of precast building technology. First off, there is a noticeable rise in demand for housing as a result of the nation's socioeconomic progress. Since there is a lack of 25 million affordable apartment complexes, the precast sector has concentrated on the idea of "Affordable homes," which is in line with the government's goal to subsidies builders. To effectively manage inter-story lateral displacements caused by earthquakes, one of the primary problems when employing moment resistant frames as the lateral force resisting system is to size the beam and column elements suitably. When building components are included that were not intended to endure large lateral displacements across stories, this control becomes even more crucial.

Computations of ATM & CM:

The time needed for building is decreased because these structures are prefabricated in a workshop. Conversely, conventional frameworks don't provide you exact control over how long a project takes to complete. Because Advance Technique Method structures are built in a workshop by highly qualified personnel under the guidance of an authorized quality assurance plan (QAP), they are constructed with better accuracy. Climate and weather have less of an impact on PEBs than on conventional construction, which is more expensive and subject to delays at the job site because of unfavorable weather or dangerous surroundings. By strategically placing the PEB manufacturing unit where trained labor is easily accessible, labor, power, material, space, and overhead expenses can all be reduced? In traditional building, variables including site, zone, climate, and labor and material availability affect the cost of the project.

Even with the known benefits of Advance Technique Method technology, many nations still adopt it slowly, and its use is not as pervasive as its advantages would imply. The high expense of shipping and the requirement for specialized equipment to lift bulky, prefabricated modules and components are frequently cited as the reasons for this low adoption rate. Adoption of this building style is further hampered by the longer lead time needed for manufacturing and buying components for the Advance Technique Method before construction can start. The standardised design, which restricts the ability to make design modifications once the project has started, is another element that makes the Advance Technique Method unattractive in residential projects..

Objective:

1. To study the work of SCM in construction work.
2. To implement the SCM in a construction project in accordance with planning.
3. To research and compare, taking into account time and cost, the advantages of the Conventional Method (CM) and the Advance Technique Method (ATM).

Results :

Supply chain management's (SCM) main goal is to outperform competitors in terms of value offered to customers. This is accomplished in a number of ways, such as by developing partnerships with suppliers, integrating activities, comprehending the value of customers, cooperative cost management, continuous improvement, and employee development. SCM has been used in a variety of contexts, including the building supply chain, where it has been used to cut expenses (particularly logistics costs), lead times, and inventories. Considering the substantial influence these expenses have on building, this emphasis is frequently quite fitting. Improving site activities by cutting expenses and length might be another area of focus. In order to prevent adverse site conditions, activities might also be moved from the site to earlier phases of the supply chain. It is imperative to have a complete and integrated supply chain view in order to successfully solve construction difficulties and capitalise on possibilities. A competitive advantage and significant value enhancement will result from this integration.

Table Comparison of conventional and prefab construction method

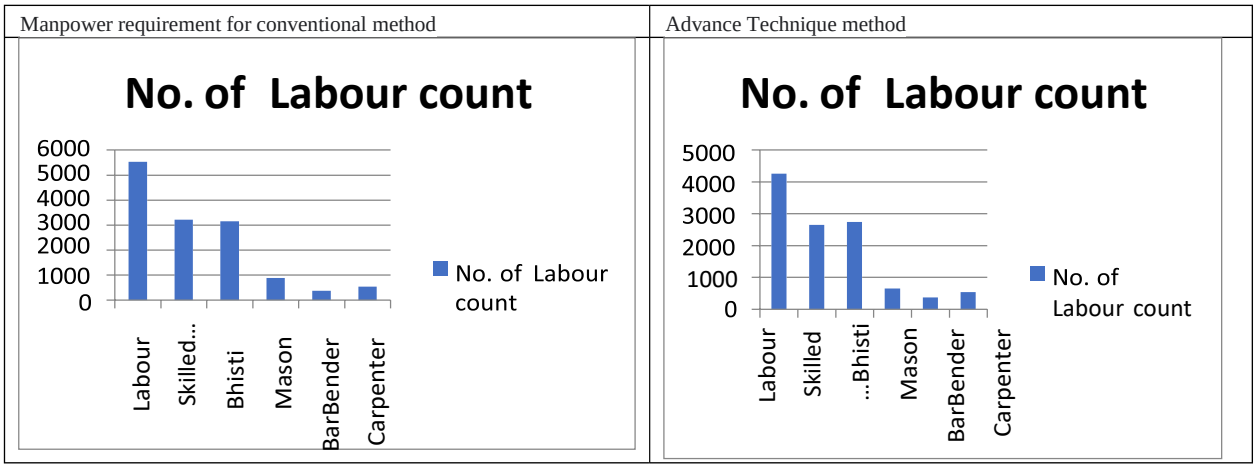
Project Duration for Conventional Construction Method		Project Duration for Advance Technique Method Construction Method	
Description	Duration	Description	Duration
Sub Structure -(Excavation, Foundation, Plinth)	58 days	Sub Structure-(Excavation, Foundation, Plinth)	58 days
Super Structure – (Column, Beam, Slab, Wall)	506 days	Super Structure – (Column, Beam, Slab, Wall)	384 days
Painting and electricity establishment	68 days	Painting and electricity establishment	68 days
Total Duration	632 days	Total Duration	510 days

Table Comparison of conventional and resource table on advance technique method construction method

Conventional construction method				Resource table on advance technique method			
Resources	Days	Rate/day	Total cost	Resources	Days	Rate/day	Total cost
Labour	5528	400	22,11,200	Labour	4260	400	17,04,000
Skilled Labour	3210	600	1926000	Skilled Labour	2650	600	1590000
Bhisti	3152	550	1733600	Bhisti	2740	550	1507000
Mason	886	600	531600	Mason	650	600	390000
BarBender	373	600	223800	BarBender	373	600	223800
Carpenter	541	700	378700	Carpenter	541	700	378700
Electrician	28	650	18200	Electrician	28	650	18200
		Total	70,23,100			Total	58,11,700

Graphical Representation for the Man Power requirement for the Conventional and ATM

Manpower requirement for conventional method and Advance Technique method



The above analysis can show as well as both figures can show the conventional method should be required more manpower and duration than Advance Technique Method. So, here we can recommend for the Advance Technique Method when we need to complete the construction within short term, for longprojects we can recommend conventional approach.

Overall construction cost for conventional approach and Advance Technique approach

Overall construction cost for conventional approach		Overall construction cost for Advance Technique approach	
Resources	Total cost	Resources	Total cost
Material Cost	6,12,44,789	Material Cost	6,12,44,789
Labour Cost	70,23,100	Labour Cost	58,11,700
5% Contingencies	34,13,394	5% Contingencies	33,52,824
Vat, Service Tax etc. @ 20%	1,36,53,577	Vat, Service Tax etc. @ 20%	1,34,11,297
Total Cost	8,53,34,860	Total Cost	8,38,20,610

Conclusion :

Supply chain management's (SCM) main goal is to outperform competitors in terms of value offered to customers. This is accomplished in a number of ways, such as by developing partnerships with suppliers, integrating activities, comprehending the value of customers, cooperative cost management, continuous improvement, and employee development. SCM has been used in a variety of contexts, including the building supply chain, where it has been used to cut expenses (particularly logistics costs), lead times, and inventories. Considering the substantial influence these expenses have on building, this emphasis is frequently quite fitting. Improving site activities by cutting expenses and length might be another area of focus. In order to prevent adverse site conditions, activities might also be moved from the site to earlier phases of the supply chain. It is imperative to have a complete

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