A COMPARATIVE STUDY ON VARIOUS TECHNIQUES IN CONSTRUCTION INDUSTRY

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ABSTRACT:The development of technology in construction industry has lead to control cost, time and quality in all aspects, when considering a construction project the contractor want to finish the work within the time, if the work is not completed within a time the cost of the project will get increased and the penalty is imposed to the contractor. In order to overcome these problems the speedy construction techniques are required. Thus the study of various speedy techniques such as Aluminium Formwork Technology, Precast Technology, Autoclaved Aerated Concrete Blocks with Conventional method develops the pros and cone of the technology and helps in implementing the effective one on comparative basis.

Keywords: speedy construction techniques, Aluminium formwork technology, Precast Technology, AAC block.

INTRODUCTION

In recent times, the construction industry has started focusing on new innovative ways of working. The construction industry has started adopting new technologies and approaches in order to increase the overall efficiency of the project. This report is about the comparisons of modern methods of construction that can be used to improve the overall construction process based on the time with conventional method. The construction industry is one of the biggest industries in the whole world. The contribution of this industry towards advancement in technologies there has been a tremendous development.Today there is a growing realization that the speed of construction needs to be given greater importance especially for large housing projects. For undertaking mass construction works, it is necessary to have innovative technologies which are capable of fast rate construction and are able to deliver good quality and durable.

IMPORTANCE OF TIME AND TECHNOLOGY IN CONSTRUCTION

There are many reasons why time and technology is important in construction. so time management will help control salary costs and construction cost. Another reason for time management in construction is to carry and finish the work as per the schedule, Time management in construction also is vital because, if projects are not finished in a timely manner, or at least as quickly aspromised, then a contract and the construction company have to lose payment for breach of contract. In such cases the new technologies are followed in the construction industry to complete the work in a scheduled time. Looking into the future, it also is important to have effective time management and new technologies in place for construction companies, because projects that are not finished on time can derail company efforts to secure bids on other projects, especially the reputation is get affected.

VARIOUS TECHNOLOGY

In this project the comparative study is carried out for the following technologies

- Conventional technology
- Autoclaved aerated concrete technology
- Aluminium formwork technology
- Precast technology

CONVENTIONAL TECHNOLOGY

The speed of construction is much slower due to step by step completion of different stages of the activities such as erection of

formwork, concreting and deshuttering and thereafter plastering and other finishing activities.

In this system the wall and the floors are casted simultaneously in one continuous operation and also the finishing work can be started immediately, so the speed of the construction is much faster.

In conventional technology, the structures are classified into two types, they are

- Load bearing structures
- Framed structures

Load bearing structures

Load bearing masonry construction was the most widely used form of construction for large buildings from the 1700s to the mid-1900s. It is very rarely used today for large buildings, but smaller residential-scale structures are being built. It essentially consists of thick, heavy masonry walls of brick or stone that support the entire structure, including the horizontal floor slabs, which could be made of reinforced concrete, wood, or steel members.

Framed structures

Concrete frame structures are a very common - or perhaps the most common- type of modern building. As the name suggests, this type of building consists of a frame or skeleton of concrete. Horizontal members of this frame are called beams, and vertical members are called columns. Humans walk on flat planes of concrete called slabs. Of these, the column is the most important, as it is the primary load-carrying element of the building. If you damage a beam in a building, it will usually affect only one floor, but damage to a column could bring down the entire building.

AUTOCLAVED AERATED CONCRETE TECHNOLOGY

The AAC began approximately 100 years ago. In 1914, the Swedes first discovered a mixture of cement, lime, water and sand that was expanded by the adding aluminum powder to generate hydrogen gas in the cement slurry. Prior to that, inventive minds had tried beaten egg whites, yeast and other unusual methods of adding air to the concrete. It was reported that foamed concrete was developed in Europe over 60 years ago and has since then been on the international market for more than 20 years.

The aerated concrete is a one types of lightweight concrete. Aerated concrete is also well-known as a cellular concrete. It can be divided into two main types according to the method of production. They are foamed concrete (non-autoclaved aerated concrete (NAAC)) and autoclaved aerated concrete (AAC). i) Foamed concrete is produced by injecting preformed stable foam or by adding a special air-entraining admixture known as a foaming agent into a base mix of cement paste or mortar (cement + water or cement + sand + water). ii) The AAC is produced by adding in a predetermined amount of aluminum powder and other additives into slurry of ground high silica sand, cement or lime and water.

ALUMINUM FORMWORK CONSTRUCTION TECHNIQUE

The system of aluminum forms has been used widely in the construction of residential units and mass housing projects. It is fast, simple, adaptable and cost – effective. It produces total quality work which requires minimum maintenance and when durability is the prime consideration. This system is most suitable for Indian condition as a tailor–made aluminum formwork for cast–in–situ fully concrete structure.

In this system of formwork construction, cast – in – situ concrete wall and floor slabs cast monolithic provides the structural system in one continuous pour. Large room sized forms for walls and floors slabs are erected at site. These forms are made strong and sturdy, fabricated with accuracy and easy to handle. They afford large number of repetitions (around 250). The concrete is produced in RMC batching plants under strict quality control and convey it to site with transit mixers.

Aluminum Formwork system is a comparatively a new technology in India.It saves cost, time and improves the quality of construction.Aluminum formwork is very cost effective for repetitive Buildings layouts and for above the plinth work.Aluminum formwork panels can be designed for any condition/components of buildings such as bay windows, stairs, balconies and special architectural features. This system is very unique as all the components in buildings, including slabs, beams, walls, columns,

staircases, balconies and special window hood are of concrete and there is no need for block works or brick works.

PRECAST TECHNOLOGY

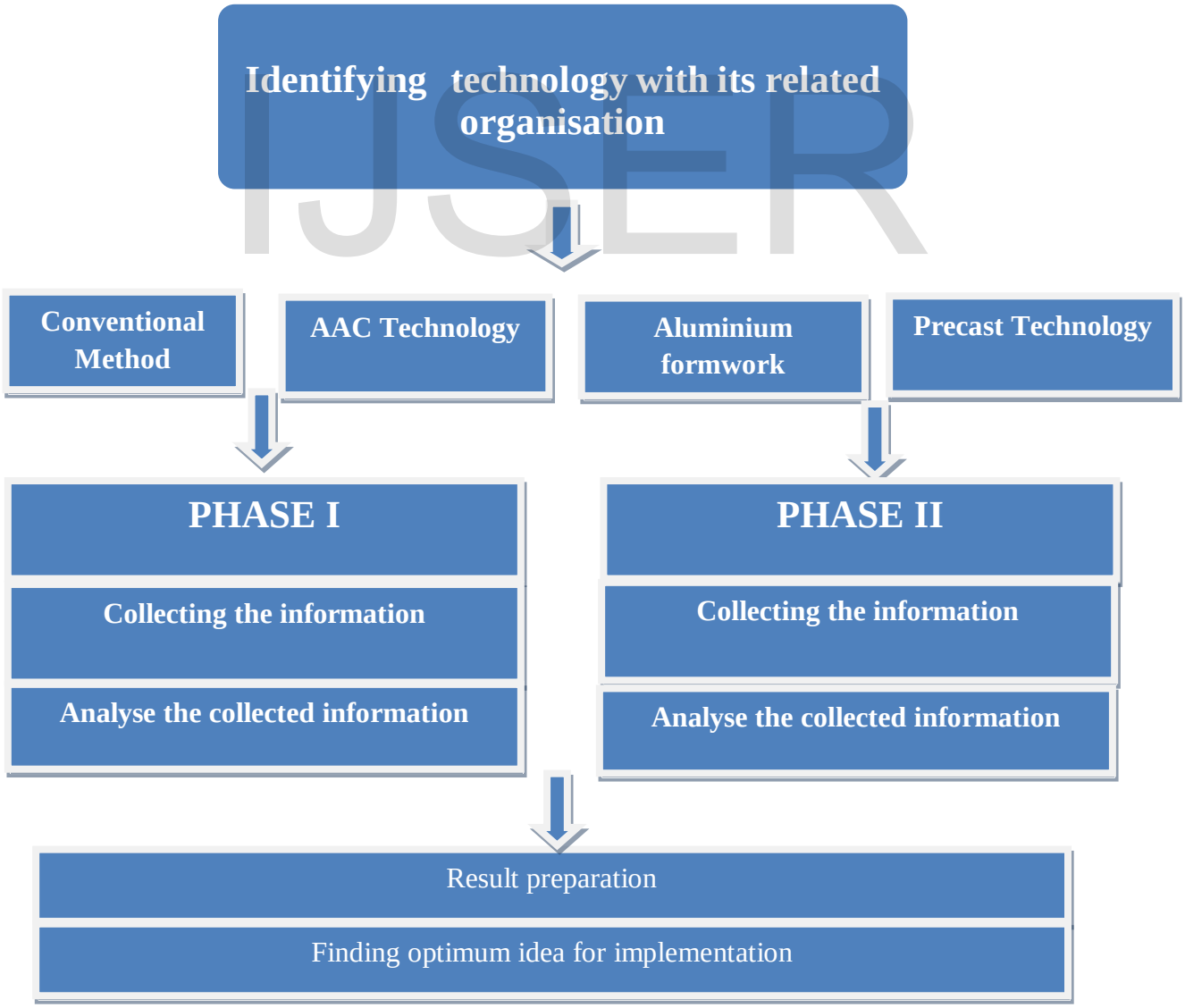
The concept of precast also known as prefabricated construction includes those buildings where the majority of structural components are standardized and produced in plants in a location away from the building, and then transported to the site for assembly

These components are manufactured by industrial methods based on mass production in order to build a large number of buildings in a short time at low cost. The main features of this construction process are as follows:

- The division and specialization of the human workforce
- The use of tools, machinery, and other equipment, usually automated, in the production of standard, interchangeable parts and products

This type of construction requires a restructuring of the entire conventional construction process to enable interaction between the design phase and production planning in order to improve and speed up the construction. One of the key premises for achieving that objective is to design buildings with a regular configuration in plan and elevation.

METHODOLOGY



The productivity is taken for the following works AAC block construction, conventional block construction, plastering work.

Table 4.4 Productivity for Plastering Work for brick masonry

S.NO	NO OF MASON	NO OF MALE HELPER	NO OF FEMALE HELPER	OUTTURN
1	5	2	2	550 Sq.ft
2	7	3	2	805 Sq.ft
3	5	2	1	500 Sq.ft

Table 4.5 Productivity for Plastering Work for AAC block masonry

S.NO	NO OF MASON	NO OF MALE HELPER	NO OF FEMALE HELPER	OUTTURN
1	4	2	4	399.2 Sq.ft
2	6	3	2	571.2Sq. ft
3	8	4	3	832 Sq.ft

Table 4.6 Productivity for AAC block construction

S.NO	NO OF MASON	NO OF MALE HELPER	NO OF FEMALE HELPER	OUTTURN
1	4	1	2	15.2 cub.m
2	5	1	3	16 cub.m
3	4	2	1	6.8 cub.m (above lintel level)

Table 4.7 Productivity for Conventional brick construction

S.NO	NO OF MASON	NO OF MALE HELPER	NO OF FEMALE HELPER	OUTTURN
1	5	2	1	6.5 cub.m
2	3	1	2	4.2 cub.m
3	7	2	3	11.6 cub.m

Table 4.8 Productivity for shuttering

S.NO	CATEGORY OF WORK	NO OF CARPENTER	NO OF HELPER	OUTTURN
1	Column shuttering	1	1	20 nos
2	Lintel, sunshade	1	1	80-100 Sq ft
3	Beam, roof shuttering	1	1	150-200 Sq ft

Table 4.9 Productivity for reinforcement

S.NO	CATEGORY OF WORK	NO OF BARBENDER	NO OF HELPER	OUTTURN
1	Column	1	1	35 nos
2	Lintel, sunshade	1	1	100 Sq ft
3	Beam, roof shuttering	1	1	180 Sq ft

DATA ANALYSIS

From the collected productivity, we get the result that

Table no 5.1 Productivity result for masonry

NO OF LABOUR	CONVENTIONAL BRICK MASONRY	AAC BLOCK MASONRY
1M+1H	1.3 cu.m	3.5 cu.m

From this data,the productivity of AAC block construction is 2.6 is more than conventional brick construction.

Table no 5.2 Productivity result for plastering

NO OF LABOUR	PLASTERING IN CONVENTIONAL BRICK MASONRY	PLASTERING IN AAC BLOCK MASONRY
1M+1H	120 sq.ft	99.6 sq.ft

From this data, the productivity of plastering in AAC block masonry is little less compared to conventional brick.

CONCLUSION

The construction firms all over the world have been studying to adopt the innovation and changes, so it is the need of time to analyse the technologies, from the result of collected data in phase I, From the comparative study, I conclude that the productivity of AAC block construction is approximately 2 to 3 times more than the ordinary brick construction and the additional work like plastering is not necessary for AAC block construction we can go directly for putty work. If plastering is done for AAC block masonry, the productivity is little less compared to conventional brick masonry. from comparing these factor, the construction time is minimized in AAC block construction compared to ordinary brick construction.

FUTURE WORK

Collection of data for Aluminium form work technology and precast technology.

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