



## International Journal of Intellectual Advancements and Research in Engineering Computations

### Identifying the difficulties in adopting new technologies in construction

Jithinvishnu<sup>1</sup>, P.Gokuldeepan<sup>2</sup>

<sup>1</sup>Master of Engineering Student, Department of Civil Engineering, EASA College of Engineering and Technology, Coimbatore

<sup>2</sup>Assistant Professor, Department of Civil Engineering, EASA College of Engineering and Technology, Coimbatore

#### ABSTRACT

The construction industry is changing rapidly, and new materials and technologies are being introduced on a regular basis. Execution of construction projects and their timely delivery has become a prime concern for developers in view of the buyer sagitation on delay in construction. Rising industrial, residential and commercial growth is driving demand for faster construction and world-class quality. It has become imperative to use newer products and technologies to meet this increasing demand. The construction industry in India is at the cusp of problematic change with new materials, building innovation, software, digitization and artificial intelligence changing the manner in which we conceptualize, build, and use our buildings. Private developers are continuously exploring new technologies that improve the quality, strength and safety of the buildings. In metro cities, few developers have started using self-climbing formwork, aluminium shuttering, precast concrete techniques and drywall systems. These advancements are practical, but offer advantages such as minimal labour required, higher earthquake resistance, more durability, bigger floor covering territory, smooth finish on walls, and lower upkeep. Such technologies not only reduce the turnaround time but also improve the quality and durability of construction. The purpose of this study is to find difficulties in using the new technologies in construction industries. This study is conducted to identify the factors that affecting the implementation of new technology according to contractors and engineer through a questionnaire survey. Data is to be collected using questionnaires which will be distributed among engineers and contractors of small- and large-scale construction companies. The data will be analysed and solutions are to be recommended. The finding of this paper is useful for construction industries for achieving effective performance in constructions.

**Index terms:** New technologies, Difficulties in adoption, Survey

#### INTRODUCTION

The technological innovation of civil engineering construction is involved with the benefit achievements and the brand creation of engineering construction companies, and also closely related with the improvement of people's living conditions. As structural designing is the principal part of building development, the construction parties of civil engineering must make technological innovation based on the changing

and developing society, and utilize new advances and new techniques to make development of undertakings. This paper makes investigation on a few methods for mechanical advancement of structural designing development, purposed to advance the reasonable improvement of structural building through supportive conversation and investigation. The alleged structural building alludes to an overall term of science and innovation utilized in the development of different kinds of building offices, and it incorporates various trains and

covers investigation, plan, upkeep, fix and other specialized exercises. The last assistance objects of structural designing development is the structure, while the structure serves the creation and life of individuals, so the last help object of structural building is individuals, by which structural building ought to have the qualities of encouraging individuals' creation and life and offering support for individuals. Individuals' creation and life depends on the continually changing and creating society, so individuals must make advancement in the development of structural building as per the social turn of events and change, in order to satisfy the developing needs of individuals for materials and culture and to assist individuals with improving material life and otherworldly delight [1-5].

## AIMS AND OBJECTIVES

The main aim of this project is to identify the difficulties in adopting new techniques in adopting new techniques in construction industries. The main objective of the project is to list out the factors affecting the adoption of new technology in construction projects through conducting a survey based research. This study tries to analyse all the difficulties in adopting new technology in construction projects through interviewing different construction firms from small scale contractors to large scale contractors and the engineers working in their firm. By identifying the difficulties we can find a solution to overcome these factors [6-10].

## MODERN TECHNOLOGIES

In decades, the conventional construction industry has been considered as a labour-intensive, low-tech industry with low productivity. It seems construction sector has been left behind by technologies innovations and sciences

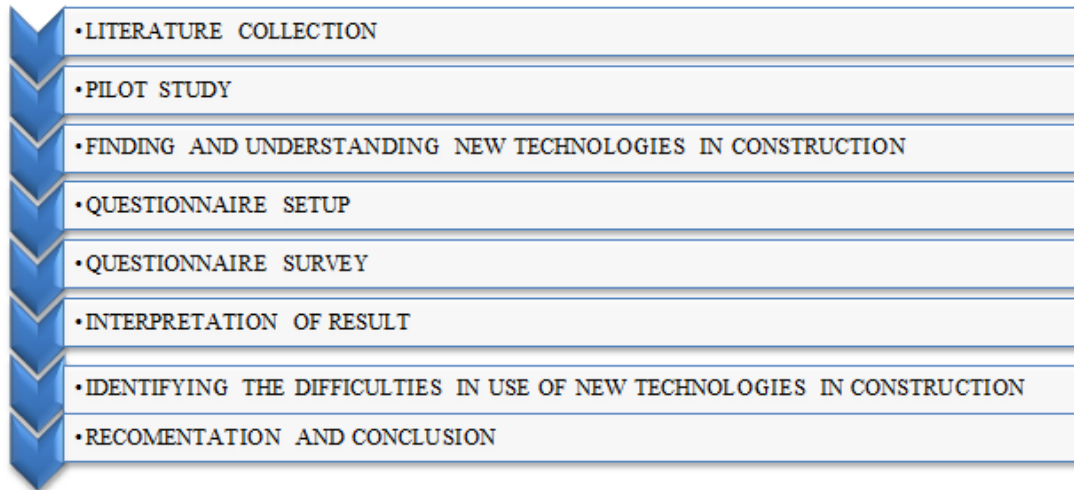
developments that have already reshaped many other industrial sectors. Mass production and automation was introduced in the early twentieth century. It was a method of producing products in large quantities with relatively low cost. The product were produced in many different components and assembled into a finish product through an assembly line, the approach of this method has reshaped manufacturing industry especially in the sector of automobile, aircraft, train etc. it has proved that automation is the key to increase productivity [11-13].

These Construction methods are the latest trends in industry practicing:

- Prefabrication
- Pervious Concrete
- Self-consolidating Concrete
- Self-Healing Concrete
- Breath Brick
- Ready Mix Concrete
- Aluminium Shuttering

## METHODOLOGY

The methodology selected for this research paper is questionnaire survey. The questionnaire is prepared with the reference to the literature reviews and field experts like planning engineer, site engineer, contractors, sub-contractors, skilled labors etc. having more than 5 years of experience in site. The questionnaire is conducted between the contractor and the site engineer of large- and small-scale construction sites. The questionnaire is categorized into three parts consisting Part A, Part B and Part C. The Part A of the questionnaire consists of surveyor details, Part B general details of the respondent and Part C consists of the questions to determine whether the respondent is familiar with the technology and what are the difficulties they face while implementing them.



## DATA COLLECTION

The study was carried out by preparing the questionnaire for survey. The questionnaire contains several factors which cause the delay in construction. The questionnaire was distributed among 10 engineers, 10 contractors and 10 clients. The questionnaire consisted of 23 questions out of which 17 were yes or no questions and 6 were explanation type questions.

## ANALYSIS AND RESULT

After conducting the questionnaire survey the common difficulties in adopting new technologies in construction were identified by comparing survey results between the engineer's contractors and clients. The most common factors why new technology is not adopted by Construction Company are listed below

1. Lack of knowledge
2. Lack of skilled labour
3. Availability of modern equipment
4. There is no globally accepted test standard to undergo
5. The measurement and monitoring must be more precise
6. Transportation costs are higher
7. Lack of suitable transportation
8. Lack of synergetic information platform
9. Lack of practice and experience
10. Lack of industry team
11. Lack of well-developed technical system
12. Lack of technology transfer

13. That the potential obstructions to utilize pre-assembled components like the absence of research data
14. Higher beginning development cost
15. Constrained site space
16. No interest for construction
17. Resolute for configuration changes
18. Supply chain management and logistics
19. Construction market risks

## DISCUSSION

From the results of questionnaire given by the engineers we deduct that the engineers are mostly aware of the modern technologies and know-how of implementing the methods but choose not to implement them as they feel it's risky and bit more costly and require special skilled laborers which is not easily available. The contractors on the other hand half of them were aware and are up-to-date with the new techniques while half were unaware of the new technologies. The contractors of with the know how are tend to be young and below the age of 30 the unaware group of contractors fell in the middle-aged group. Even with the knowhow the contractors are not ready to implement the methods as the clients are very concerned for implementing new technologies. The clients prefer the old and traditional way even though that is costlier and time consuming. The clients find it more reliable and safer method. The government contractors who are aware of new techniques are not able to implement new technology as the work

order given to them specify the methods and the materials that need to be used for construction. Only on few exceptional cases the new technologies were implemented, those cases there were no other options to be done. For example, projects where they had to cross a pipe line below the active railway track. In that situation the government engineer did a survey to find alternative methods but could not find any method that could work on a long-term basis so they had to go with horizontal drilling which is a bit costlier but efficient method. The clients are mostly unaware of the modern technologies and the ones who are aware are not interested in implementing them. They prefer the old traditional and costlier method. The clients feel that the new equipment's are very unsafe and they are scared of them failing and losing their money. The clients are mostly common folks who want to get a normal home for them to stay. They take loans or invest all their life saving into their homes so most of them just go with the usual techniques. Even the larger clients like the villa builders find it too much of a risk to go forward with new techniques as they know a simple mistake can ruin their reputation. They tend to keep their reputation intact than the profit they could be getting from completing the project faster and in a more economical method.

## CONCLUSION AND RECOMMENDATIONS

In this paper the difficulties in adopting new technologies in construction sites are researched. A questionnaire and personal interviews through engineer, contractors and clients have formed the basis of this paper. The study reveals that the difficulties in adopting the technologies are:

1. Lack of knowledge
2. Lack of skilled labour
3. Availability of modern equipment
4. There is no globally accepted test standard to undergo
5. The measurement and monitoring must be more precise

6. Transportation costs are higher
7. Lack of suitable transportation
8. Lack of synergetic information platform
9. Lack of practice and experience
10. Lack of industry team
11. Lack of well-developed technical system
12. Lack of technology transfer
13. That the potential obstructions to utilize pre-assembled components like the absence of research data
14. Higher beginning development cost
15. Constrained site space
16. No interest for construction
17. Resolute for configuration changes
18. Supply chain management and logistics
19. Construction market risks

The benefit of this study will educate engineer's contractors to identify the major benefits of using new technologies and their advantages. This study will help to identify future difficulties easily for the future projects. Some recommendations for overcoming the difficulty factors are as follows:

- 1) Construction firms to be required to innovate and generate bespoke solutions to overcome unique project-specific challenges. This requires time and resources, and it is important that individuals are formally rewarded for their efforts, rather than knowledge creation being left to a few dedicated individuals who do it informally in their own time. It is important that knowledge is created quickly, and in a way that is easy to share and will be helpful to others. See Standards below for more information.
- 2) Globally accepted tests should be implemented by the international committee this gives the newer technology a common stand with the other techniques. This can attract new companies in adopting the techniques.
- 3) 3)The syllabus should be updated every year so that the newer engineers coming out of the degree courses are aware of the newer technologies in industry. The companies should provide free courses that can help their employees to attain newer skills

## REFERENCES

- [1]. CICE B-2, "Technological Progress in the Construction Industry," Construction Industry Cost Effectiveness Project Report B-2, The Business Roundtable, 1982.
- [2]. CICE B-3, "Construction Technology Needs and Priorities," Construction Industry Cost Effectiveness Project Report B-3, The Business Roundtable, 1982.
- [3]. Blair, D.C., "The Data-Document Distinction in Information Retrieval," Communications of the ACM, 27(4), 1984, 369-374.
- [4]. Blair, D.C. and M.E. Maron, "An Evaluation of Retrieval Effectiveness for a Full-Text Document Retrieval System," Communications of the ACM, 28(3), 1985, 289-299.
- [5]. CII, Constructability: A Primer, Publication 3-1, Construction Industry Institute, Bureau of Engineering Research, The University of Texas at Austin, Austin, Texas, 1986.
- [6]. CSI, Master format: Master List of Titles and Numbers for the Construction Industry, the Construction Specification Institute, 1988.
- [7]. Bjork B.C., "A Prototype Building product Model using A Relational Database," In Proceedings of the 2nd Symposium on Computer Aided Design in Architecture and Civil Engineering, 1989.
- [8]. Bjork B.C. and P. Hannu, "A Scenario for the Development and Implementation of A building Product Model Standard," Proceedings for the Symposium of Current Research and Development in Integrated Design, Construction, and Facility Management, CIFE, Stanford University, California, March, 1989.
- [9]. Chang, L.M., and D.V. DeVoe, Emerging Technologies for Electrical and Instrumentation Construction, A Report to the Construction Industry Institute, Div. of Construction Engr. and Manag., Purdue Univ., 1992.
- [10]. Essays, UK.. The Advanced Construction and Building Technology Construction Essay. Retrieved from <https://www.ukessays.com/essays/construction/the-advanced-construction-and-building-technology-construction-essay.php?vref=1>
- [11]. "The Advanced Construction and Building Technology Construction Essay." All Answers Ltd. ukessays.com, 2019. <<https://www.ukessays.com/essays/construction/the-advanced-construction-and-building-technology-construction-essay.php?vref=1>>.
- [12]. The Advanced Construction and Building Technology Construction Essay, 2018. Available from: <https://www.ukessays.com/essays/construction/the-advanced-construction-and-building-technology-construction-essay.php?vref=1> [Accessed 2019].
- [13]. "The Advanced Construction and Building Technology Construction Essay, 2018. <<https://www.ukessays.com/essays/construction/the-advanced-construction-and-building-technology-construction-essay.php?vref=1>>.