

An Investigation On The Existing Barriers And Possible Measures For The Implementation Of Automation Technology In Indian Construction Industry

P. Anirudh Akarsh, G.Manikandan

Department of Civil Engineering, SRM University, Kattankulathur, TN, India.

Corresponding Email: droptoakarsh@gmail.com

Abstract—In India complaints of poor quality and unsafe practice of construction have been traditional problems which have to be rectified as the industry is at rapidly growing phase. Automation technologies have a promising potential which can overcome various barriers and enhances the efficiency and productivity of construction firms. Automation can be broadly implemented in all the phases of construction from initial design through onsite execution, maintenance and management control over the project. By identifying the major barriers for implementation in Onsite construction and suggesting the possible measures to overcome them, contribution could be made in promoting the available robotics and automation technologies and provide scope for better understanding and facilitating. This paper discusses the existing state of automation and robotics in Indian construction industry and stimulates the future potential of construction firms. Further discussions are made on major barriers for implementation of automated technologies, and certain areas where automation technologies can be adopted will be presented

Keywords— Indian construction, Automation, Robotics, Barriers, Remedies

I. INTRODUCTION

Construction sector in India despite of being one among the largest industrial sectors which enhances the growth and economy of the country faces various challenges related to construction processes such as low quality, reliability and productivity. Industry also faces labor shortages for expertise construction activities which opened the discussion to identify the revolutionary solutions.

One Probable option is implementation of automation technologies which have great potential to enhance the performance of industry. However major barriers are being limited utilization and lack of technical labors to adopt the modern innovative technologies shows the immediate need for creating the awareness on the benefits of automation and robotics in construction which make the construction works easy, safe and quicker. The use of new machineries and different innovative methods will provide scope for changes in construction industry in recent few decades.

II. OBJECTIVES OF THE STUDY

The main objective of this paper is to identify the major barriers for the implementation of automation technologies and robotics in Indian construction industry. Establishing an understanding the principles of automation and to present the

latest advancement of the technologies and comparing their efficiency with the traditional methods.

II. METHODOLOGY

In order to ascertain the present scenario of automation technology and robotics in Indian construction industry questionnaire have been made and data analysis has been made from survey.

Survey includes qualitative and quantitative information of the companies. The closed type questionnaire has been adopted for the survey. The questions are classified based on the company's annual revenue, types of projects undertaken, workforce and other crucial aspects related to the construction process

III. INTRODUCTION OF THE TECHNOLOGIES

Technologies which can be adopted in India

- Semi-automated masonry unit (SAM 100)
- Automated rendering machine

1. Semi-automated masonry unit (SAM 100)

The new robot SAM (semi-automated mason) has been designed to improve the efficiency of human workers without replacing them completely by new technology

The robot is responsible for picking up bricks applying mortar, and constructing masonry structure, while a human partner handles the more delicate tasks such as laying bricks for corners, tidying up the mortar and setting up the worksite. This robot is built to be robust and durable with a life span of approximately 10 years.

2. Automated rendering machine

The main task of the plastering robot is the application and initial smoothing of plaster on the wall and controlling the excessive application of material.

IV DATA ANALYSIS

A questionnaire consisting of various classified questions has been developed and distributed to various construction firms, sub-contractors, specialist contractors/builders and construction consultants to establish the better understanding on automation and robotics technologies. These companies were approached to provide information regarding the construction process, suggested practices, Present and future

scenario of automation and obstacles for use of automation technologies in construction.

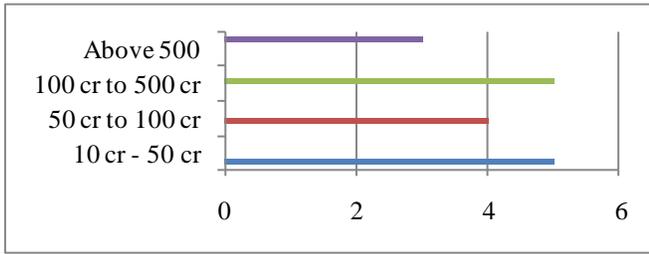


Figure 1 companies annual revenue

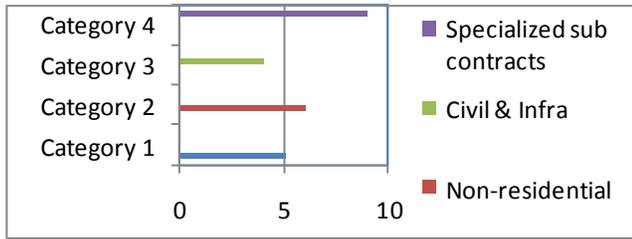


Figure 2 Adoptability of automation

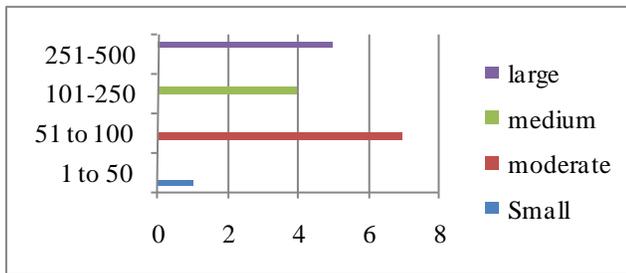


Figure 3 Full time staff of companies

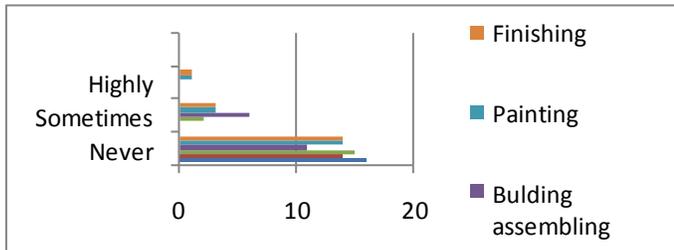


Figure 4 On-site construction utilization

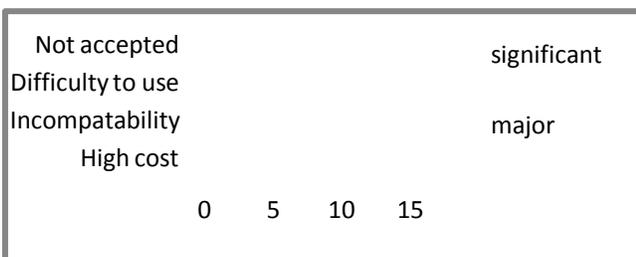


Figure 5 Barriers for implementation of automation
Discussions

As the main objective of the paper is to identify the barriers for implementation of automation technologies in Indian construction projects for the better development of industry. Along with larger construction firms both small and medium construction firms are in need to implement in various phases of construction. Few globalized companies are more likely to adopt advanced technologies in order to gain advantage over competitors for globalized projects.

By the evidence of literature, Construction industry in India is composed by small to medium companies which undertake different kinds of construction projects with different strategy and control of those projects it is unlikely to assume these companies adopt automation technologies in near future. Therefore these companies should be encouraged to adopt automation technologies to enhance efficiency and productivity.

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