

“Obstacles in Implementing Automation in Indian Infrastructure Projects”

Akash S. Tambi¹, A. R. Kolhe², Upendra Saharkar³

¹M.E. (Construction and management) Civil Department, Dr. D.Y. Patil Institute of Engineering and Technology, Pune University, India

²Head of civil Department, Dr.D.Y.Patil School of Engineering, Lohagaon, Pune University, India

³PG-Coordinator, Civil Department, Dr. D.Y. Patil Institute of Engineering and Technology, Pune University, India

Abstract: The construction industry is labour intensive and construction work is conducted in risky and dangerous situations. The importance of construction automation has grown rapidly in developed countries. In developing countries like India, the construction industries need automation technologies such as new machineries, electronic devices etc. The infrastructure project requires more numbers of skilled labour, good quality of work, increases productivity etc. The problems associated with construction work such as decreasing quality of work, labour shortages, and safety of labour and working condition of projects. To overcome these problems new innovative technologies such as automation which has the potential to improve the quality, safety, and productivity of the industries must be implemented. This paper describes the information about automation in Indian construction industry by using qualitative study of local construction industries in and around Pune. The qualitative study has been carried out by taking interviews of the professional working in local construction industries in and around Pune. From this qualitative study some obstacles in implementing automation are discussed in this paper.

Keywords: Automation, Construction Industry, Infrastructural projects, Obstacles

I. INTRODUCTION

Infrastructure construction is growing very largely in India. The construction industry needs automation techniques to perform the risky and dangerous work for good quality of work, increase productivity, reduce duration etc. Automation has been indicator of technological and developmental progress of infrastructure project. In developed countries such as Japan, Germany the use of Automation, developing the techniques and implementing automation are as good as compared to the developing countries such as India and China.

India is experiencing the large volumes of works in Infrastructure projects and a shortage of skilled labour so; there is need of automation technologies in Infrastructure projects and other construction works. The use of automation techniques will result in the less use of labours, less cost of project, early time of completion and increases the quality and productivity of construction work. The unskilled labours are unable to do good quality of work and take so much time as compared to automated technology. In this paper, the main objective is to discuss the obstacles in implementing automation in Indian infrastructure projects and construction industry. Literature review is taken to find out current status of automation in local construction firms.

II. DEFINITIONS OF AUTOMATION

- i. “Automation is the technique, method, or system of operating or controlling a process by highly automatic means, as by electronic devices, use of control systems and information technologies, reducing human intervention to a minimum.” [1]
- ii. “The automation as pertaining to construction industry is the use of mechanical and electronic means to achieve automatic operation or control to reduce potential exposure, time, or effort while maintaining or improving quality.” [2]
- iii. “Automation is the use of an electronic or computerized tool by a human being to manipulate data or produce a product.” [3]

For rapid construction with less risk and good quality there has been more and more use of machines as well as equipment in the construction industry. Advancement in the fields of science and technology are utilized in many fields including civil engineering in general and construction in particular. Human efforts and risks are reduced by using machines, robots, etc. at appropriate places. Since India has second largest man - power in the world automation is not replacements of the human-power but is an important supplement that caters to the need of mega-construction and fast-track construction. Nowadays, in India the human power is replace by new technologies of automation because of unskilled labour, they do not give good quality of work as compared to

automation. Automation increases the productivity of the construction project, reduces the duration and laborious work, and increases the construction safety, increases the quality of work as compared to unskilled worker.

III. LITERATURE REVIEW

According to Shinko Research co. Ltd, (2007) that industrialization of construction in Japan started around 1960 with the advent of Pre-fabricated houses made of steel and wood. [4]

According to Thomas Bock (2007) that German brickwork construction is characterized by the high percentage of private builders and extreme orientation to the craft trade, machines and auxiliary devices are applied at a large extent to increase productivity and relieve the worker of physical load. [5]

According S.M.S.Elattar (2008) that the primary contribution of automation in construction is the development of a comprehensive, multidimensional analysis of costs and benefits associated with a specific automation application. [6]

According to Mohan Ramanathan (2007) Automation has been an indicator of technological and developmental progress of construction industry. The objectives of any automation have to improve the quality of work, productivity, higher safety for both workers and public through developing machines for dangerous job, uniform quality of work with higher accuracy. Improving work environment as conventional manual work is reduced to minimum so workers are relieved from dangerous work, but disadvantage of automation is high cost, less knowledge to the worker, high maintenance cost etc. [7]

IV. RESEARCH METHODOLOGY

This paper aimed that the obstacles in implementing automation in Indian construction industry and infrastructure projects. For this qualitative survey interviews are taken of various construction experts such as Project Managers, Engineers, and Contractors in different construction firms of Pune. This involved 15 professional experts in various construction firms. The interviewees were selected have experienced near about 5 to 8 years working in the different construction firms so that they will give proper answer and more information about automation in local construction firms. The average time of the interview is 15-20 minutes each because of their busy schedule of professional experts. In the interview, different question are asked to know more about the automation techniques and obstacles in implementing automation in local construction firms.

V. FINDINGS

V.I High Cost

The majority of respondents are told that expensive technology and this is the greater obstacles to implementation. Larger companies have higher capacity to invest in the automation technologies. Cost would be a major factor in deciding on whether take or not to take on a technology. Cost consideration should include not only the purchasing cost, but also the maintaining the automation technologies and see that it can improve overall efficiency and productivity. One of respondent said that, depending on the firm's turnover and the market competition, cost may not be most important factor. This will apply for minority of firms.

V.II Limited Resource Available to Small and Medium Size Firms

For small and medium size firms the resource should be available for using automation technology. The funding of small and medium size firm is sufficient to purchase the automation technology according to their turnover. The small and medium size firms are unable to purchase new technologies because of fund available is very less as compared to big firms. Small and medium size firms have not enough skilled labor which can handle automation techniques.

V.III Automation Technologies are Expensive to Update and Maintain

As discuss earlier, that the cost of implementing automation techniques are high. These techniques are so expensive to update and maintain the progress of automation techniques. There maintenance cost is also high so that nobody wants to invest in such expensive technologies, especially the smaller companies. The main obstacle in implementing automation technologies is mostly on-site construction work. On-site, the grounds are not properly level and unpredictable environment.

V.IV Automation Technologies are Unavailable Locally or Difficult to Acquire

According to respondent, automation would suit repetitive works where standard components or layouts are used, may be pre-cast components or pre-fabricated housing, siphorex blocks etc, but these are only application within certain areas. Implementation of automation may be a problem if the technology is not readily available commercially or is difficult to acquire because of some restrictions or other. The technology is not available locally, but you can get it from somewhere.

V.V Low Technological Knowledge to Workers

This is the main obstacle during implementing automation technology. The techniques are not easily accepted by workers due to they have no knowledge about automation. Nowadays, there is need to training of workers to operate these techniques in proper manner. There are so many unskilled labor in India. They do not operate various machines such as screed concrete floor finishing, automated pavement crack sealer etc, because of they have no knowledge about this techniques.

VI. Conclusion And Recommendation

As the main objective of this paper were to find out the obstacles in implementing automation technologies in Indian infrastructure projects and construction firms. The importance of implementing automation technologies is the need of today’s infrastructure project and construction firms to increase the productivity and good quality of work. Both small and medium size firm are the need of automation technologies to implement in different sectors such as design, planning, on site construction etc. Small and medium size firms are encouraged to adopt automation technologies. They give information or training to the labor to operate automation techniques.

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