



Robotics Application in Construction Industry

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ABSTRACT

This paper describes the working of robotics on construction site. This paper present basic concept of robotics application in brickwork used in construction site and operated by skilled labour. Many construction work are done by moving objects i.e. material so robotics application is helpful.

Keywords— Construction Site, Construction Work, Construction Industry, Automation and Robotics, Labour, Brickwork

I. INTRODUCTION

In construction sector, there is large scope for automation and robotics technologies. There would be chance to use of automation and robotics technologies in all stages of construction. CAD is used for automation of design process. For the production of cost estimate, schedule of construction and project management through use of planning and costing software used. The degree of automation and robotics system complete in construction varies from one sector to another one. By chance automation of design by using CAD is highly indifferent nowadays unlike use of robotics on site operation or automation systems. The most consequence advantages of robotics application and automation system application in construction industry are – increase productivity and work efficiency with less cost, higher accuracy in work, than that provided by skilled labour or worker, occupational safety growth for worker and better safety for public and increase the time efficiency.

II. METHODOLOGY

2.1. General

The methodology process of carried out by this project was performed in the following manner:

1. Determine poor quality and safety standards
2. Determine robotics and automation in manufacturing sector
3. Complete automation in construction sector
4. Comparison between labour work and automation
5. Suggestions for use of automation in construction

2.2 Problem Statement

Employment of robots for performance of various production tasks for increases the productivity in construction industry. Labour are doing the work on site but not with accuracy. For achieving the accuracy in construction work there is necessity of automation.

2.3 Advantages and Disadvantages

Advantages

1. Robotics in construction provides more precise and uniform quality.
2. It replaces labors where is difficult task
3. Robotics carry out jobs much easier which is hardly done by labors.
4. It reduces time and increases efficiency of productivity.
5. It conducts labor tasks where dangerous locations

Disadvantages

1. The unemployment rate will increase.
2. If the employees have no experience, they will need training program to interact with the new robotic equipment, it will take time.
3. The robots can produce lots of electronic wastes.

2.4 Aim and Objectives of the Study

Aim: To evaluate output productivity constant by using robotics in building construction.

1. To study step wise procedure and automation technologies in brick laying construction.
2. To evaluate output productivity constants of brick laying construction on basis of data collection.
3. To study the general feasibility of robotic application at the present and future state of building and robotic technology.

4. To analyze result on basis of collected data of building construction.

PARTICULARS	NO	L	B	H	Q(Q=L*B*H)
Brick work					
long wall					
l1=13.2+0.3	3	13.5	0.3	3	36.45
=13.5					
shortwall					
s1=9.9-0.3=9.6	2	9.6	0.3	3	17.28
s2=5.4-0.3=5.1	2	5.1	0.3	3	9.18
					62.91
Deduction					
door					
D1	3	0.9	0.3	2.1	1.701
D2	3	0.75	0.3	2.1	1.4175
window					
W1	3	1.2	0.3	1.5	1.62
W2	4	0.9	0.3	1.5	1.62
					6.3585
					Total 56.5515

2.4 Limitation

1. Any point on this robotics arm can only move along a circular path. Any task involving motion other than the circular motion cannot be performed by such robot.
2. While designing a robot the most important thing to be taken into consideration is, the function to be performed.

2.5 Future Scope

Due to uncertain technology development, the industries are trying to reduce man power where they are trying to increase automation in industries. Now this is used in each and every company where machines are used and some or other process is used. For increment of the productivity in construction sector automation is very helpful. Automation and robotics is reduce labour work and increase time efficiency so it will work more than labour.

III. PRIOR APPROACH



This is the case study which we visited. The location of site is “Florida watercolor Residence” in Kesav Nagar, Pune and calculated the material and labour cost which are required for 600 sq. ft plan.

On the basis of rate analysis we calculated the total cost of material for 56 m³ = 300580 Rs/- And for the labour cost for 56 m³ = 59920 Rs/-

IV. OUR APPROACH

In this we take a robot i. e. Hadrian 105. It works 24hrs in a week. Its construct house 1-2 days and also bricklaying efficiency is more than the labour. Labour can handle 100-200 bricks in hour but Hadrian can handle 1000 brick per hour.



Its working process is shown in following table :

	Automated machinery	Manual labour
Initial capital cost	2000000	3,60,000
Operating cost	1,070500	60,000
productivity	76,79,000	55,46,000



The robot is 92ft (28 metres) long which is connected to its main body. This robot work that can grab bricks, pick them up, and place them down in sequence. 3D computer-aided design (CAD) is used to design house and structure required and robot calculate where each brick should placed. Mortar is also placed on brick by used of human hand. There should leave some spaces for wiring and plumbing.

V. CONCLUSION

On based on this analysis if the used of this equipment 57.85 % etime efficiency will be achieved. Quality of output is greatly achieved is 66.76% and also the accidents will be minimum. The cost will be reduce as compared with 5 years investment will be reduce as 51.67% so that the profit and productivity as invested in a robot will be achieved in 5 years will be is 57% of the invested cost will be more economical because it is only one time investment.

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