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STUDY OF FACTORS AFFECTING LABOUR PRODUCTIVITY

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ABSTRACT

Labour productivity plays very important role in all projects . Labour productivity effects are on the contractor, sub-contractor and owner also. There are number of factors affecting labour productivity on any construction sites. So, in this study researcher have suggested number of practical solution to increase labour productivity.Questionnaires survey was conducted for top ranked important factors which are affecting labour productivity and expert's solutions were collected from the survey to improve labour productivity on site. First of all, on site labour productivity is calculated; at the same time factors affecting labour productivity are identified. Researcher has found some practical solutions and these were implemented on site to improve labour productivity. After implementation of solution, it was observed that, labour productivity is increased. Then we carried out comparative study of before and after labour productivity.

Kyewords: *productivity, labour, minimum wages, efficiency, time management*

INTRODUCTION

Construction industry is the world 's largest and most challenging industry among all others. Today human resource has a strategic role to increase labour productivity in any organization and hence human resource plays superior role in industrial competition.(Abraham Assefa Tsehayae, Aminah Robinson Fayek (2016)).Construction labour productivity is having critical importance , as it directly affects the competitiveness and profitability of construction companies . In India , there are many challenges faced by construction industries , but one of the most important is low labour productivity . Construction costs are constantly on the rise , as duration for completion of the project is substantially increasing and most projects are significantly overrunning considering their budget . Higher productivity levels allow contractors to improve competitiveness , simultaneously increase profitability, so they pay higher wages to workers to complete activities in time . Economics defined the labour productivity as the ratio of total product output to total labour input or simply the ratio of output to input. Construction is a labour intensive industry and lobour related costs in most countries often account for 30%-60% of the total costs of a construction project .(Bon-Gang Hwang , chin Kiat Soh (2013)). The current traditional practice of estimating and scheduling reles on several sources to predict the productivity rates, which would include an estimator's personal judgment , published productivity data and historical project data. The construction industry has progress last few decades through advance in heavy equipment, tools and materials .Navertheless, labour productivity still needs improvement . Non -value-added activities spend 50%-75% of the productive time on construction site. (Caldas, jung-YeolKim , Carl T. Haas , Paul M. Goodrum , Di Zhang (2014)). Therefore maintaining and improving labour productivity is a key to making a construction project successful . The researcher have studies and analyzed construction tool time ,labour productivity on construction sites and have

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investigated the real composition of the total time spent by construction labours on different activities. The general observation was that the real direct tool time was only 40%-60% of the total time of activities .(In Upul Ranasinghe, Janaka Ruwanpura , Xin Liu (2012)) .This study we analyzed factors affecting labour productivity and practical solutions were implementation on construction sites.

STATEMENT OF THE PROBLEM

Wages and salaries administration aspect is the most vital in achieving productivity of the organization. This is the major problem faced by the most organization and which has consequently deprived them of achieving effective wages and salaries administration, this cannot be over emphasized because it will help to improve employee productivity, the efficiency and morals of the firms their-by leading to the organization effectiveness.

SIGNIFICANCE OF THE STUDY

The significance of this study , is that it explores ways in which maximum productivity or efficiency through adequate, motivation of workers can be assured within an organization, in private sector .

The research project affords an opportunity of going into an in-depth knowledge as to how the human and technical element can be managed towards improved or higher wages and salaries.

REVIEW OF LITERATURE

In the study, effort are made to identify the remote and immediate causes of administration of wages and salaries on employee productivity in a private organization. In other words, the study shall be limited to the issues in objectives of the study then to examine the wages by which private sectors administers wages and salaries being paid to employees in their organization or establishment.

1. Productivity management is vital for long - term endurance of business. However, there are serious barrier to obtain successful productivity management because several administrator do not have the proficiency or time to investigate productivity and take required actions in a timely trend.(Khaled Mahmoud El-Gohary, RemonFayek Aziz, Hesham A. Abdel-Khalek. (2017)).
2. The factor affecting Labour Productivity and techniques used to evaluate the labour productivity . Researcher suggest that ineffective supervision of construction possessions results in decreasing resource productivity.(Sudam Chavan, Hemant Salunkhe. (2016)).
3. Productivity means unit of Work done per Man-Hour or the counter of Labour Productivity; Man-Hours per unit also can be used . So, Productivity is a ratio of efficiency to total or Sum of the resources used in production.(Upul Ranasinghe, Janaka Ruwanpura, Xin Liu. (2012)).
4. Improving the Construction Productivity is the utmost issues in Construction business. India is a developing economy it is estimated that it can be Third Economy till 2050. (Dharani K).

OBJECTIVE OF STUDY

1. To evaluate the impact of wages and salaries administration as a tool for attaining organization productivity.
2. To determine the effect of wages and salaries administration in the private sector administration in the private sector and the employee performance with particular reference.
3. To ascertain the effectiveness of wages and salaries administration.
4. To evaluate the impact of wages and salaries administration as a tools for motivating, promoting, training and staff development in order to enhance employee productivity.
5. To find out how wages and salaries can contributes to improve employee productivity in their organization.

LIMITATION OF STUDY

This research study focuses on the impact of wages and salaries administration on employee productivity. The researcher was

faced with some problems in the course of carrying out the study.

1. The first problem encounter was financial problem.
2. Secondly, time factor, the research, was carried out along side with academic works and other day-to-day activities.
3. Thirdly, there was no enough co-operation from the respondent as some of then felt reluctant answering most of the questions being asked by them.

RESEARCH METHOLOGY

The present study constitutes the comparison of sites of construction. This will be done from the secondary data collected from the websites.

RESEARCH DESIGN

Questionnaire survey was conducted for top ranked factors which are affecting labour productivity and practical solutions were collected. We calculated labour productivity in terms of time and cost on selected two construction sites for formwork, reinforcement work and concrete work activities . Factors were identified affectinglabour productivity. Then practical solutions are found out to increase labour productivity. These solutions were implemented on sites for improvement in labour productivity. After implementation of solutions, again productivity is calculated to find out increase in the productivity. The detail of work was given below.

DATA COLLECTION

Two construction siteswere selected to calculate daily labourproductivity . Fifty factors were collected from literature survey to prepare questionnaires survey. These questionnaires were distributed to contractors , engineers and sub-contractors and response were collected to improve labour productivity.

QUESTIONNAIRE SURVEY

Questionnaire survey was preferred as the best effective and suitable data-collection technique for the study. Questionnaires were collected by personally from respondents in sangli district (Maharastra, India). First, pilot survey was conducted by eight experts and then questionnaire were collected by 50 engineers, contractors and construction companies. using Relative important index (RII) method (Krishna P. Kisi Nirajan Mani, Eddy M.Rojas, E. Terence Foster (2016))top 100 respondent from the survey factors were selected from the data collected by questionnaire survey. In questionnaire, respondents suggested number of solutions for improvement in labour productivity.

Ranges:- 1 : Does not affect it, 2: Somewhat affect it, 3: Directly affect it.

Relative important index (RII) = [Sum weights]/ [Total No. of respondents* Highest Range]

Sum Weight ranges [1: Does not affect it , 2: Somewhat affect it , 3: Directly affect it]

Number of respondents for each factor:

Productivity Formula: Productivity is generally the ration of the output to input.

Productivity=Output/ Input

Labor Productivity (In terms of cost)= {Output quality cost / Labour time cost}

Labour Productivity (in terms of time)= {Output work / Work hour}

RELATIVE IMPORTANCE INDICES AND RANKS OF ALL PRODUCTIVITY FACTORS

SR.NO.	FACTORS	RELATIVE IMPORTANCE INDEX (RII)	RANK
1.	Morality (alcohol influence)	0.94	1
2.	Availability of materials	0.92	2

3.	Rain	0.89	3
4.	Work planning and scheduling	0.86	4
5.	Availability of workforce	0.86	5
6.	Economic conditions	0.86	6
7.	Payment delay	0.85	7
8.	Safety	0.84	8
9.	Availability of tools and machinery	0.81	9
10.	Specification	0.81	10
11.	The level of management control	0.77	11
12.	Quality experience and training	0.77	12
13.	Sequence of work	0.74	13
14.	The professionalism of the design	0.72	14
15.	Frequent changes in labours	0.72	15
16.	Overtime	0.58	16
17.	Development and research	0.52	17

It is based on quantitative methods .

Calculation of labour productivity before implementation of solutions on sites

First of all researcher prepared a lobour productivity chart for formwork, reinforcement work and concrete work activities. Every day we noteddown the quantity of work completed on site. Then productivity for each day is calculated. Also researcher found factors affecting productivity of labours. Researcher calculated daily labour productivity for skilled and unskilled labours. Labour productivity is calculated only for one-floor ;before and after implementation of solutions on sites. Factors affection labour productivity are found out from the calculations. The day which is having less productivity shows there are some problems. Then problems are analysed and solutions for these factors were implemented on site, which shows the increase in labour productivity. It means solutions applied are correct and are useful in increasing productivity.

Sr No.	**Factors affecting labour productivity**	**Implementations of solutions on sites**
1.	Non – tool time means labour are not using that particular tools	Supervisor to control labours and motivate to labours towards the completion of the project.
2.	Site access	Proper site access clear as per site layout.
3.	Safety	Safety tools and equipment , insurance provided to labours.
4.	Lack of material transportation	Formwork – Use extra unskilled labours Concrete work. Concrete work – Use lift machine or RMC pump.
5.	Housekeeping and cleaning	Weekly.

6.	Availability of material	Maintained stock of material on site.
7.	Availability of workforce	As per requirement activity of work.
8.	Work planning and scheduling	1. Primavera P6 Software used for planning and scheduling monitoring of work. 2. As per resource planning and scheduling of work.
9.	Communication problems between site management and labour	Every day communicate between site engineer and labour contractor.
10.	Communication break between labour and supervisor	Every day communicate with supervisor and labours, labour contractor.
11.	Site Supervisor difficulties	Daily communicate with the senior engineer and project manager.
12.	Quality of Supervision	One week basic training of site work was given to supervisor from project manager.
13.	Finance management	The owner was taken the loan from national and local banks.

Calculation of labour productivity after implementation of solutions on sites

Implementation of solutions on sites, after labour productivity were calculated on sites. The labour productivity charts making in excel sheet and set formula's to sheet. Sites reading was putting into chart after give automatic results of laours productivity. The sum of labour productivity for all activities were calculated from start to end for one floor and these total labour productivity for activities are written in following tables and figures. The totallabour productivity of all activities in terms of time and cost after implementation of solutions on sites. The separate labour productivity of activities and total productivity of activity , skilled and unskilled .

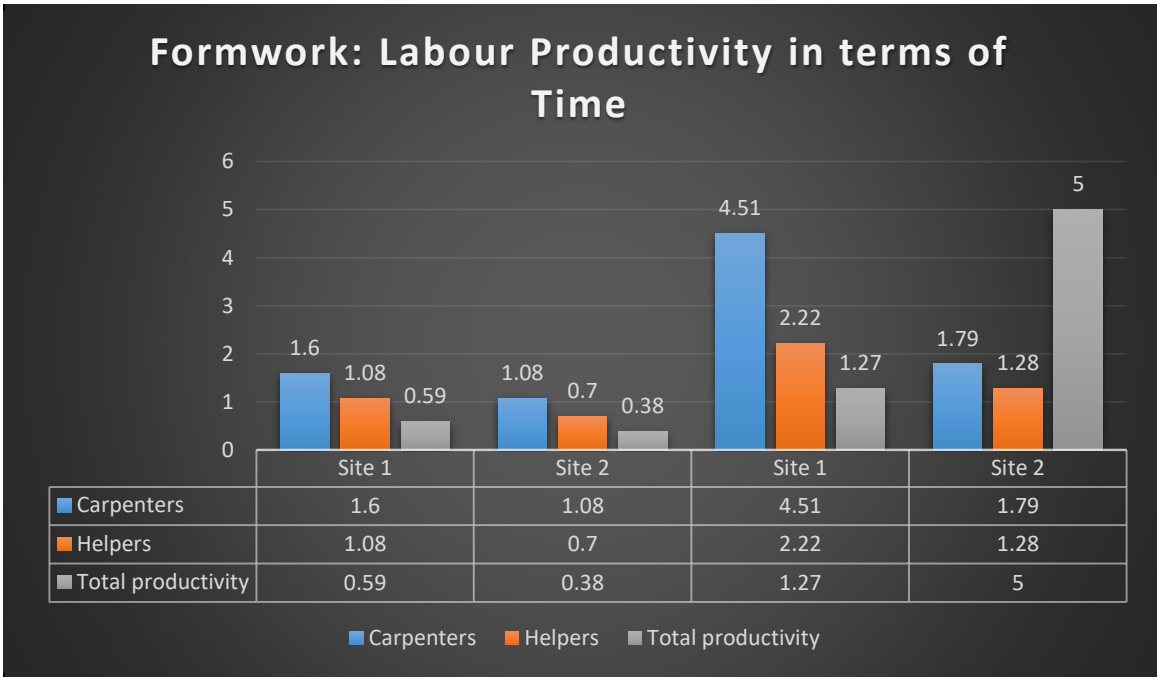
	Labour Productivity
Site No.	**Labours productivity before implementation of solutions**
1.	Total labour productivity for all activities in terms of time (3^{rd} Floor)
1.	Total labour productivity for all activities in terms of cost (3^{rd} Floor)
2.	Total labour productivity for all activities in terms of time (2^{nd} Floor)

Labour Work-Time Difference Amount

The "labour work-time difference amount" is the cost for work completed by labours and cost of time required to complete work. The total labour-time difference amount is calculated separately for formwork, reinforcement work and concrete work activities on labour productivities charts before and after implementation of solutions on both the sites.

RESULT

After implementation of solutions, from calculated data for formwork, reinforcement work and concrete work on both sites it is observed that labours productivity in terms of time and cost increases. Detail comparison of labour productivity for both sites as shows in the following figures:

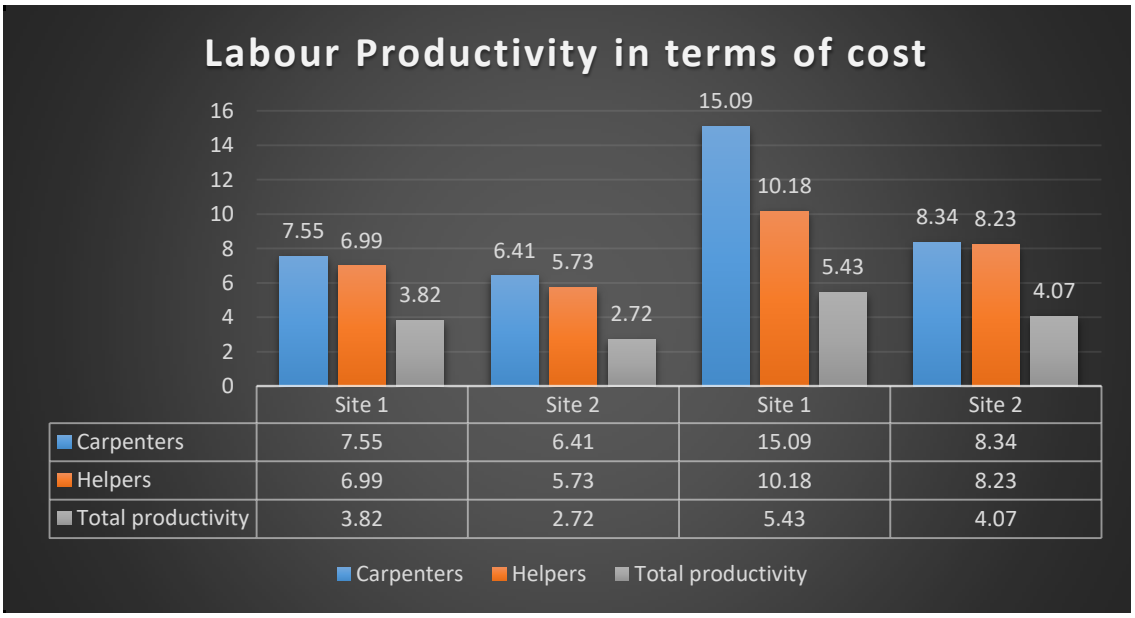


Site1 and Site 2- Formwork Labour Productivity before and after implementation of solutions in terms of time

ANALYSIS: The data collected that factors and solutions will be used in future to increase the labour productivity for engineers, contractors, sub- contractors and construction companies in many types of construction work.

H1: There is significant difference between the labour productivity and time management.

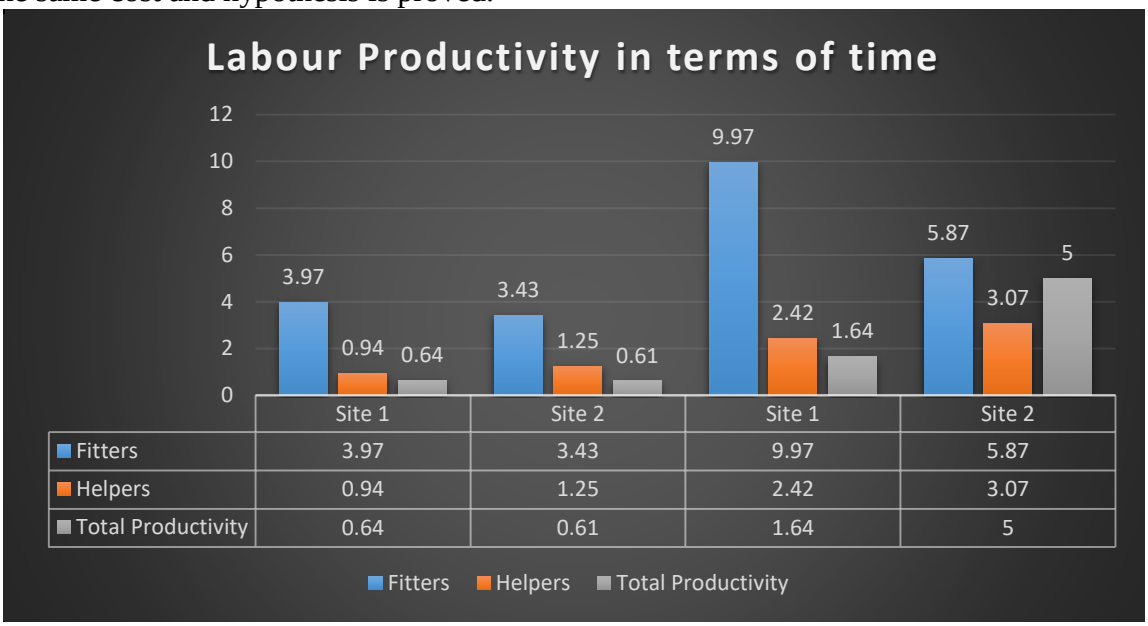
When it is compared with the site one, where without input labour productivity was 23% however the targeted inputs the productivity of carpenters, helpers and total productivity has gone up to 72 % with the same working conditions and hypothesis is proved.



Site1and Site 2 : Reinforcement work Labour Productivity before and after Implementation of solutions in terms of cost

ANALYSIS: The data collected that labour Productivity for two sites is calculated for formwork, reinforcement work and concrete work in terms of cost .

H1: There are significant difference between Labour productivity in terms of cost management. When it is compared with the site one, It is without input of labour productivity was 83.8%.However, the targeted input the productivity of carpenters, helpers and total productivity has gone up to 88% with the same cost and hypothesis is proved.

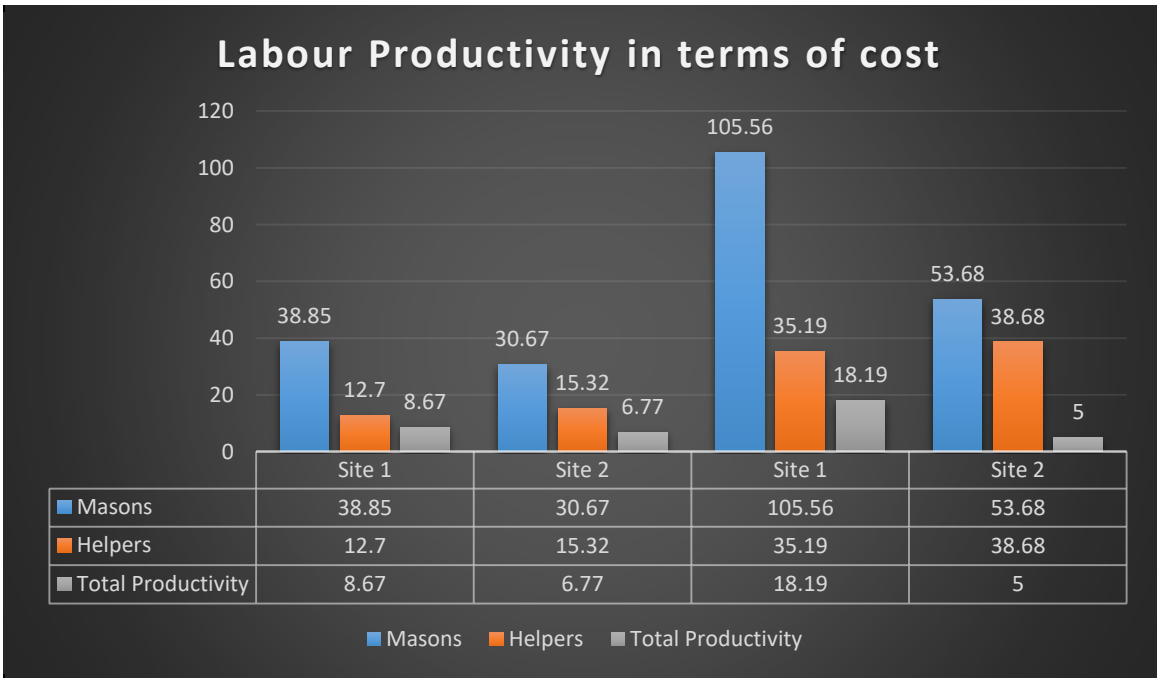


Site1 and Site 2 : Concrete work Labour Productivity before and after Implementation of Solutions in terms of time.

ANALYSIS: The data collected that Labour Productivity for two sites is calculated for formwork, reinforcement work.

H1: There is significant difference between staff training, development and employee productivity.

When it is compared with the site one, the input of employee productivity was 83.8%.However, the target is increase by 88% from the staff training, development and employee productivity and hypothesis is proved.



Site 1 and Site 2 : Concrete work Labour Productivity before and after Implementation of Solutions in terms of cost.

ANALYSIS: The survey suggested that before and after implementations of solutions the labour productivity for formwork, reinforcement work .

H1: There are significant differences between labour productivity in terms of cost.

When it is compared with the site one, the input of labour productivity was 77.3%.However, the targeted input of the productivity of Mason, helpers and total productivity has gone up 87% with the same cost and hypothesis is proved.

CONCLUSION

1. Any compensation program must have the strong linkage to the profitability at the production level and business level.
2. The program should ensure that it establishes accountability, ownership and service orientation at all level.
3. The key to motive employees is compensation package i.e. direct wages are low but other benefits are more which are based on productivity. They vary according to productivity.
4. Compensation helps to retain competent employees in the organization.
5. Attractive compensation package also enhance the competitiveness of the company.
6. The factors which are affecting on labour productivity were identified for the activities formwork, reinforcement work and concrete and practical solutions for these factors were found out. The practical solutions were implemented on sites to increase labour productivity.
7. The increase in labour productivity shows that solutions implement on both the sites are correct and useful for engineers, contractors, sub-contractors and construction companies in many types of construction work. Total work cost and time cost amount difference was increase for site 1-15.27% and site 2- 25.52% .

REFERENCES

1. Abraham Assefa Tsehayae, Aminah Robinson Fayek. (2016). "Developing and Optimizing Context-Specific Fuzzy Inference System-Based Construction Labor Productivity Models" J.Constr.Eng.Manage.,10.1061/(ASCE)CO.1 943786 2.0001127.
2. Bon-Gang Hwang, Chin Kiat Soh. (2013). "TradeLevel Productivity Measurement: Critical Challenges and Solutions" J.Constr.Eng.Manage.,10.1061/(ASCE)CO.1 943786 2.0000761.
3. Carlos H. Caldas, Jung-Yeol Kim, Carl T. Haas, Paul M. Goodrum, Di Zhang. (2014). "Method to Assess the Level of Implementation of Productivity Practices on Industrial Projects" J. Constr. Eng. Manage., 10.1061/(ASCE) CO.1943- 7862.0000919.
4. E.C. Lim. (March 1996). "The Analysis of Productivity in Building Construction" Loughborough University., https://dspace.lboro.ac.uk/2134/7150.
5. Khaled Mahmoud El-Gohary, RemonFayek Aziz, Hesham A. Abdel-Khalek. (2017). "Engineering Approach Using ANN to Improve and Predict Construction Labor Productivity under Different Influences" J. Constr. Eng. Manage.,10.1061/(ASCE)CO.1943- 7862.0001340.
6. Krishna P. Kisi, Nirajan Mani, Eddy M. Rojas, E. Terence Foster. (2016)."Optimal Productivity in Labor-Intensive Construction Operations: Pilot Study" J. Constr. Eng. Manage., 10.1061/(ASCE) CO.1943- 7862.0001257.
7. Rodrigo A. Rivas, John D. Borcherding, Vicente González, Luis F. Alarcón. (2011). "Analysis of Factors Influencing Productivity Using Craftsmen Questionnaires: Case Study in a Chilean Construction Company" J. Constr.Eng.Manage., 10.1061/(ASCE)CO.19437862.0000274.
8. SampadaKhanapurkar, Pooja Gadekar, Nilesh Bawankukle, Saurabh Ingole, S. S.

Sanghai. (2016). “Analysis of Labor Productivity” International Research Journal of Engineering and Technology (IRJET)., Volume: 03, Issue: 06.

9. Sudam Chavan, Hemant Salunkhe. (2016).“ A Study on Labor Productivity in Construction Industry” International Journal of Engineering Research., Volume No.5, Issue Special 1 pp: 247-249.
10. Upul Ranasinghe, Janaka Ruwanpura, Xin Liu. (2012).“Streamlining the Construction Productivity Improvement Process with the Proposed Role of a Construction Productivity Improvement Officer” J. Constr. Eng. Manage., 10.1061/(ASCE)CO.1943-7862.000046.
11. Dharani K, International Journal of Latest Trends in Engineering and Technology (IJLTET) Eng. Varma Santosh, Prof. M. R. Apte *IOSR Journal of Mechanical and Civil Engineering (IOSR-JMCE) e-ISSN: 2278-1684,p-ISSN: 2320-334X, Volume 10, Issue 5 (Jan. 2014), PP 64-71 www.iosrjournals.org*

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