INTERNATIONAL JOURNAL OF PROGRESSIVE RESEARCH IN ENGINEERING MANAGEMENT AND SCIENCE (IJPREMS)

e-ISSN : 2583-1062

Impact Factor : 5.725

www.ijprems.com
editor@ijprems.com

Vol. 03, Issue 07, July 2023, pp : 410-415

A RESESRCH STUDY ON LABOUR PRODUCTIVITY ANALYSIS OF BUILDING CONSTRUCTION INDUSTRY

Mr. Amit R. Gurav[1], Prof. Amarsinh B. Landage[2]

[1]Student M. Tech Construction Management, Government College of Engineering, Karad, M.S. India

[2]Assistant Professor, Government College of Engineering, Karad, M.S. India

ABSTRACT

Construction project contractors are seeking for ways to reduce waste and boost profitability because profit margins are always narrowing and competition is growing. The use of statistical techniques holds the potential of minimising, if not completely eliminating, non-value-added activity, despite the fact that numerous strategies have been created to increase the efficacy and efficiency of the construction process. One of the most important businesses in every economy is construction. It makes a sizable contribution to the national economy and employs a sizable number of people. The scientific study of the conservation of human resources in the quest for the most effective way to complete a task is known as time and motion study (sometimes known as motion and time studies; the phrases are interchangeable). Time and motion studies are conducted to assess human efficiency through improved planning and reliable employee incentive schemes

Keywords – Labour productivity,time motion,work study,regression analysis

1. INTRODUCTION

Labour profitability is a crucial financial metric that is closely related to monetary trends, assertiveness, and expectations of general economic comfort. The term "labour efficiency" refers to the total amount of income delivered per unit of work (measured as the number of employed people) for a specific time reference period (also known as "gross domestic product," or GDP). Marker provides general information on the effectiveness and makeup of human capital in the process of creation for a specific financial and social environment, as well as other correlative data. Information clients are able to evaluate the levels of GDP inputs to work and the rate of development after a certain amount of time. sources of knowledge and current developments. It was one of the indicators used to measure progress towards reaching the Millennium Development Goals (MDGs), specifically Goal 1 (eradicate poverty), due to its skill in expressing important data on the circumstances of the country's work sample. Goal 8 of the Sustainable Development Goals (SDGs) (support sustainable, comprehensive, and sound monetary development, full and profitable entrepreneurship, and not too bad work for everybody) includes this as one of the indicators to gauge progress towards attaining the goal. The two main focuses of any nation's development sector are carrying out development and boosting profitability. India's growing industry is a vital component of the country's economy. The second largest industry in India after agribusiness, development generates 40% to 50% of the country's capital consumption for enterprises in a variety of sectors including motorways, streets, trains, vitality, air terminals, water system, etc. The GDP of India is made up of around 11% of it. Any negotiated benefits association is very concerned with increasing efficiency. The ratio of information to yield is generally referred to as efficiency. Efficiency can be increased with proper resource management. The most valuable resource for a development organisation is labour.

2. LITERATURE REVIEW

In development enterprises, there are three basic components of arrangement: time, cost and quality. These thoughts are in a cozy relationship with each other. In addition, the profitability of work is a key idea in efforts to arrange development and has a direct mutual relationship with the above-mentioned triple requirement. (SerdarUlubeyli, AynurKazaz, BayramEr., 2014). A lower execution of works is clearly identified with the proximity of work progress, failures and modifications. Normally a 30% loss of expertise occurs when the changes are completed. The most critical types of interruptions are the absence of materials and data and back-to-back work. These interruptions inflict a daily skill loss of 25% - half. (H. Randolf Thomas & Carmen I. Napolitan). Work efficiency is also one of the exhibition indicators that determine the success of a development company. Since development is a labor-escalating industry, it can very well be argued that labor is the predominant profitable asset. Therefore, the effectiveness of development depends primarily on human effort and execution. Work efficiency is an important list in light of the grouping of work that is expected to complete the explicit work. (Wen yi & Albert P.C.Chan, 2014). Profitability is for the most part a part of revenue. In the status type it may very well look like this:

Productivity = Output ÷ Input

= Total output ÷ Total work hour.

INTERNATIONAL JOURNAL OF PROGRESSIVE RESEARCH IN ENGINEERING MANAGEMENT AND SCIENCE (IJPREMS)

e-ISSN : 2583-1062

Impact Factor : 5.725

www.ijprems.com
editor@ijprems.com

Vol. 03, Issue 07, July 2023, pp : 410-415

3. METHODOLOGY WORK STUDY

To understand the work of work studies, we need to understand the work of technology studies and time studies. Study technique (also called Work Method Design here) is mostly used to improve the strategy for doing work. It is similarly suitable for new openings. As the study of technology is applied to existing occupations and jobs, it intends to discover better strategies for performing duties that are conservative and safe, require less human effort, and require less preparation/dedication time. Better engineering involves the ideal use of the best materials and the right work to get the job done efficiently, resulting in increased asset utilization, better quality, and lower costs. It can therefore be stated that by studying technology we have a precise method of creating the adequacy of human assets, high utilization of machinery and hardware, and utilization of materials. The time study then again gives the standard time, which is the time required by the worker to complete the occupation according to the standard strategy. Standard opportunities for different occupations are important for a legitimate estimate.

- Manpower, machinery and equipment requirements
- Daily, weekly or monthly material needs
- Production cost per unit as an input for better decision making or purchasing
- Work budgets
- Efficiency of workers and payment of incentive wages.

3.1 Method Study Procedure-

The following general steps describe the procedure for conducting a method study.

1. Select the job - to which method the study should be applied.
2. Get information and record it.
3. Examine the information critically.
4. Create the most functional, prudent and successful strategy by thinking about the real obstacles of the circumstances.
5. Install the new method as standard procedure.
6. Maintain standard procedure by regular monitoring.

4. PROBLEM STATEMENT

Correlation and regression techniques can be used to increase productivity and identify the root of low production. Higher productivity in an organization leads to national prosperity and a better standard of living for the entire community. Productivity improvement using time and motion studies is used in construction and related industries. Work study consists of 2 aspects, method study and measurement, which when effectively applied lead to higher productivity. The main problem of construction productivity depends on the way labor is used. Work productivity may be higher or lower depending on factors such as availability of workload, material, work tools, energy availability, work efficiency, motivation level, training level of working conditions (comfortable or bad) etc. For the aforementioned aim, Sinhgad Guardian, Paranjape Broadway Wakad, and Pristine Equilife have each logged five days of observation.

1) Study Area 1- Sinhgad Guardian
2) Study Area 2 - Paranjape Broadway Wakad
3) Study Area 3 - Pristine Equilife

5. RESULT AND DISCUSSION

5.1 Study Area 1 - Sinhgad Guardian

Table 1 Labour Productivity Observations- Study Area 1

Observation No.	1	2	3	4	5	6	7	8	9	10
Time Observed										
10:00	PW	PW	PW	PW	PW	PW	PW	PW	PW	PW
10:30	PW	PW	PW	PW	PW	PW	PW	PW	PW	PW
11:00	PW	PW	PW	PW	PW	PW	PW	PW	PW	PW
11:30	PW	PW	PW	PW	PW	PW	PW	PW	PW	PW
12:00	PW	PW	PW	PW	PW	PW	PW	PW	PW	PW

INTERNATIONAL JOURNAL OF PROGRESSIVE RESEARCH IN ENGINEERING MANAGEMENT AND SCIENCE (IJPREMS)

e-ISSN : 2583-1062

Impact Factor : 5.725

www.ijprems.com
editor@ijprems.com

Vol. 03, Issue 07, July 2023, pp : 410-415

12:30	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP
13:00	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP
13:30	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP
14:00	PW	PW	PW	PW	PW	PW	PW	PW	PW	PW
14:30	PW	PW	PW	PW	PW	PW	PW	PW	PW	PW
15:00	PW	PW	PW	PW	PW	PW	PW	PW	PW	PW
15:30	PW	PW	PW	PW	PW	PW	PW	PW	PW	PW
16:00	PW	PW	PW	PW	PW	PW	PW	PW	PW	PW
16:30	PW	PW	PW	PW	PW	PW	PW	PW	PW	PW
17:00	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP
17:30	PW	PW	PW	PW	PW	PW	PW	PW	PW	PW
18:00	PW	PW	PW	PW	PW	PW	PW	PW	PW	PW

- **Productivity Table**

Table.2 Productivity Table – Column Sinhgad Guardian

Activity	No.Of Workers	No.Of Observations	No.Of Samples	Expected Productivity	Productive Work %	Non Productive Work %
1	6	10	54	89%	80	17.7
2	6	10	54	89%	79	21
3	6	10	48	89%	80	20

There is 78.86% productive work on site and 21.14% unproductive work, according to our analysis of all the activities at Sinhgad Guardian and the productivity table above.

5.2 Study Area 2 - Paranjape Broadway Wakad

Table. 3 Labour Productivity Observations- Study Area 2

Observation No.	1	2	3	4	5	6	7	8	9	10
Time Observed										
10:00	PW	PW	PW	PW	PW	PW	PW	PW	PW	PW
10:30	PW	PW	PW	PW	PW	PW	PW	PW	PW	PW
11:00	PW	PW	PW	PW	PW	PW	PW	PW	PW	PW
11:30	PW	PW	PW	PW	PW	PW	PW	PW	PW	PW
12:00	PW	PW	PW	PW	PW	PW	PW	PW	PW	PW
12:30	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP
13:00	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP
13:30	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP
14:00	PW	PW	PW	PW	PW	PW	PW	PW	PW	PW
14:30	PW	PW	PW	PW	PW	PW	PW	PW	PW	PW
15:00	PW	PW	PW	PW	PW	PW	PW	PW	PW	PW
15:30	PW	PW	PW	PW	PW	PW	PW	PW	PW	PW
16:00	PW	PW	PW	PW	PW	PW	PW	PW	PW	PW
16:30	PW	PW	PW	PW	PW	PW	PW	PW	PW	PW
17:00	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP
17:30	PW	PW	PW	PW	PW	PW	PW	PW	PW	PW

INTERNATIONAL JOURNAL OF PROGRESSIVE RESEARCH IN ENGINEERING MANAGEMENT AND SCIENCE (IJPREMS)

e-ISSN : 2583-1062

Impact Factor : 5.725

www.ijprems.com
editor@ijprems.com

Vol. 03, Issue 07, July 2023, pp : 410-415

18:00	PW	PW	PW	PW	PW	PW	PW	PW	PW	PW

- **Productivity Table**

Table.4 Productivity Table – Column Paranjape Broadway Wakad

Activity	No.Of Workers	No.Of Observations	No.Of Samples	Expected Productivity	Productive Work %	Non Productive Work %
1	6	10	54	89%	80	17.7
2	6	10	54	89%	79	19
3	6	10	48	89%	80	20

The productivity table above and our observations of all the activities at Paranjape Broadway Wakad lead us to the conclusion that there is 79.46% productive work and 20.54% unproductive work taking place there.

5.3 Study Area 3 - Pristine Equilife

Table .5 Labour Productivity Observations- Study Area 3

OBSERVATION NO.	1	2	3	4	5	6	7	8	9	10
TIME OBSERVED										
10:00	PW	PW	PW	PW	PW	PW	PW	PW	PW	PW
10:30	PW	PW	PW	PW	PW	PW	PW	PW	PW	PW
11:00	PW	PW	PW	PW	PW	PW	PW	PW	PW	PW
11:30	PW	PW	PW	PW	PW	PW	PW	PW	PW	PW
12:00	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP
12:30	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP
13:00	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP
13:30	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP
14:00	PW	PW	PW	PW	PW	PW	PW	PW	PW	PW
14:30	PW	PW	PW	PW	PW	PW	PW	PW	PW	PW
15:00	PW	PW	PW	PW	PW	PW	PW	PW	PW	PW
15:30	PW	PW	PW	PW	PW	PW	PW	PW	PW	PW
16:00	PW	PW	PW	PW	PW	PW	PW	PW	PW	PW
16:30	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP
17:00	PW	PW	PW	PW	PW	PW	PW	PW	PW	PW
17:30	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP
18:00	PW	PW	PW	PW	PW	PW	PW	PW	PW	PW

- **Productivity Table**

Table.6 Productivity Table – Column Pristine Equilife

Activity	No.Of Workers	No.Of Observations	No.Of Samples	Expected Productivity	Productive Work %	Non Productive Work %
1	8	10	56	88%	79	18
2	8	10	56	88%	80	20
3	8	10	56	88%	79	21

After observing all activities at Pristine Equilife and from the productivity table above, we conclude that there is 21.2% non-productive work on site and 78.8% productive work on site.

INTERNATIONAL JOURNAL OF PROGRESSIVE RESEARCH IN ENGINEERING MANAGEMENT AND SCIENCE (IJPREMS)

www.ijprems.com
editor@ijprems.com

Vol. 03, Issue 07, July 2023, pp : 410-415

e-ISSN : 2583-1062

Impact Factor : 5.725

Table. 7 Labour Productivity

S/N	Trades	Unit of Measurement	Average Trade Productivity
1	Formwork	m^2/man/hour	2.3
	(Tableform for slab/beam)		
2	Mesh placing and fixing	kg/man/hour	142
	(Slab)		
3	Concrete placement	m^3/man/hour	1.85
	(Slab, using stationary concrete pump)		
4	Drywall	m^2/man/hour	2.25
	(12 mm thick board)		
5	Painting	m^2/man/hour	5.5
	(Emulsion 3 coats, using roller)		
6	Timber door installation	num/man/hour	0.34
	(Dimensions 2100 mm x 950 mm)		
7	Wall tiling	m^2/ man/hour	1.02
	(Using adhesive to lay ceramic tiles)		
8	Floor tiling	m^2/man/hour	2.03
	(Using adhesive to lay ceramic tiles)		
9	Suspended ceiling	m^2/ man/hour	5.04
	(Exposed grid system)		
10	Air-con ducting (Metal)		
a)	Formed and insulated on-site	m^2/man/hour	2.9
b)	Pre-formed and pre-insulated	m^2/ man/hour	4.2
11	Electrical conduit installation	m/man/hour	2.71
	(20 mm diameter uPVC electrical conduit fixed to ceiling)		
12	Water pipe installation	m/man/hour	1.65
	20 mm diameter copper pipe concealed in wall		

6. CONCLUSION

- A comprehensive study can be carried out for various activities such as flooring, excavation and painting etc.
- It is also possible to use the work study concept for various construction activities to sample work and improve productivity on site.
- A study on motivation, improvement of work techniques, use of good machines and labor conflict can be done through questionnaires and sample surveys to improve productivity.
- according to the analysis in all case studies for the beam, the creation of the bottom cap takes more time than other activities (SD B)
- • Based on the productivity table provided and our observation of all activities at Sinhgad Guardian, we have determined that there is 78.86% productive work and 21.14% unproductive work taking place there.
- We infer that there is 79.46% productive work on site and 20.54% unproductive work after witnessing all of the activities at Paranjape Broadway Wakad.
- After observing all activities at Pristine Equilife and from the given productivity table, we conclude that there is 21.2% unproductive work on site and 78.8% productive work on site.

7. REFERENCES

[1] Paul Chan "Factors Affecting Labour Productivity In The Construction Industry" 18th Annual ARCOM Conference, 2-4 September 2002, Vol. 2

[2] Mr. Sujay Biswas Improving Productivity Using Work Study Technique IJREAS Vol 6 Issue 11 November 2016

[3] Aparna. B "Influential Factors Affecting Labour Productivity in Concreting of Columns" ISSN Volume 5, Issue 2, April 2015

[4] Mahesh K.S "Factors Affecting Labour Productivity in Construction Industries" IJIR , Vol-3, Issue-6, 2017

[5] Nithya C Joseph "Assessment of factors influencing Labour Productivity in Construction- A Review" (IJERT) Vol. 6 Issue 12, December – 2017

[6] Patange Vidyut Chandra "An Effort To Apply Work And Time Study Techniques In A Manufacturing Unit For Enhancing Productivity" ISSN Vol. 2, Issue 8, August 2013

[7] Nguyen Van Tam "Factors Affecting Labour Productivity Of Construction Worker On Construction Site: A Case Of Hanoi" NUCE. 12 (5): 127–138 30 August 2018

[8] Paul TY Preenen "Labour productivity and innovation performance: The importance of internal labour flexibility practices" Economic and Industrial Democracy March 26, 2015

[9] Nasiru Zakari Muhammad "Evaluation Of Factors Affecting Labour Productivity In Construction Industry: A Case Study" SSN 2180–3722 12 November 2015

[10] Brent G. Hickson "Factors affecting Construction Labour Productivity in Trinidad and Tobago" ISSN Vol.42, No.1, April/May 2014

[11] Prachi R. Ghate Importance Of Measurement Of Labour Productivity In Construction" ISSN Volume: 05 Issue: 07 | Jul-2016

[12] Mr.C.Thiyagu "Construction Labor Productivity and its Improvement" IRJET Volume: 02 Issue: 08 Nov-2015

[13] Nirajan Mani, Ph.D. A.M. ASCE1; Krishna P. Kisi2; Eddy M. Rojas3; and E. Terence Foster4

[14] josé antonio álvarez-gonzález and mª olga gonzález-morales

[15] Emir Tarik Dakin a Faculty of Economics and Administrative Sciences, Ozyegin University, Istanbul, Turkey

[16] Dimitrios Asteriou* Vassilis Monastiriotis The University of Reading London School of Economics

[17] Nariman Ghodrati,∗Tak Wing Yiu, Suzanne Wilkinson Unintended consequences of management strategies for improving 2 labour productivity in construction industry.

[18] Xiaodong Li *,Kwan Hang Chow ,Yimin Zhu,Ying Lin.

[19] Aynur Kazaz*, Turgut Acıkara Comparison of Labor Productivity Perspectives of Project Managers and Craft Workers in Turkish Construction Industry

[20] Farnad Nasirzadeh *,Pouya Nojedehi Dynamic modeling of labor productivity in construction projects

[21] Lim, E. C., and Alum, J. (1995). "Construction productivity: Issues encounteredby contractors in Singapore." Int. J. Proj. Management., 13(1), pp. 51–58.

[22] Zakeri, M., Olomolaiye, P. O., Holt, G. D., and Harris, F. C. (1996)."A survey of constraints on Iranian construction operatives' productivity."J. Constr. Manage. Econ., 14(5),pp. 417–426.

[23] Enshassi, A., Mohamed, S., Abu Mustafa, Z., Mayer, P. E. (2007). "Factors affecting labour productivity in building projects in the Gaza Strip."J. Civ. Eng. Manage., 13(4),pp. 245–254

[24] Abdul Kadir, M. R., Lee,W. P., Jaafar, M. S., Sapuan, S. M., and Ali, A. A.A. (2005). "Factors affecting construction labour productivity for Malaysian residential projects." J. Struct. Surv., 23(1), 4254.

[25] Alinaitwe, H. M., Mwakali, J. A., and Hansson, B. (2007). "Factors affecting the productivity of building craftsmen— Studies of Uganda." J. Civ. Eng. Manage., 13(3), pp169–176.

[26] Durdyev, S., and Mbachu, J. (2011). "On-site labour productivity of New Zealand construction industry: Key constraints and improvement measures." Aus. J. Constr. Econ. Build., 11(3), pp 18–33.

[27] Khaled Mahmoud El Gohary and rRemon Fayek Aziz (2014) "factors influencing construction labor productivity in egypt". J. management in engineering ,vol 30, no.1,1-9

[28] Homyun Jang, Kyonghoom Kim, Juhyung Kim, and Jaejun Kim. (2011). "Labour productivity model for reinforced concrete construction projects." Construction Innovationm Process, Management, 11(1), 92-113.

[29] Jarkas, A. M., and Bitar, C. G. (2012). "Factors affecting construction labor productivity in Kuwait." J. Constr. Eng. Manage., pp. 811–820.