

“A review on to Analysis the Techniques for Improvement of Productivity of Construction Workers”

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ABSTRACT: Poor productivity of construction workers is one of the causes of cost and time overruns in construction projects. As construction is a labour-intensive industry, this paper focuses on labour productivity in the construction industry. It covers the construction labour productivity definitions, aspects, factors affecting it. The main outcome from the literature is that there is no standard definition of productivity. The

I) BACKGROUND:

Labour productivity is of central importance to the economic health of the both developed and developing countries. Due to the size of the construction industry, productivity changes within it have significant direct effects on the national productivity and economic well-being. Many researchers have expressed concern over productivity in the construction industry. Perceptions of productivity trends vary widely within engineering academia, industry, and economic academia, where many researchers have influenced the belief that construction Labour productivity has been decreasing for decades. Economists are split, with many questioning the existence of any construction productivity decline, while others speculate as to the causes. Clearly there is a lack of agreement and understanding concerning this critical issue. Construction Labour productivity remains one of the least understood factors in the economy.

II) NEED TO STUDY:

In the construction industry productivity loss is one of the greatest and severe problems. Present construction contracts lack enough to classify recompense for productivity loss due to field factors. Of various project-costs components such as Labours materials and equipment's, Labour component is considered the most risk. Whereas others components (equipment

productivity of labour is particularly important especially in developing countries, where most of the building construction work is still on manual basis in this paper the Literature review is conducted through referred researches and journals to show different findings and theories related to the productivity rates and the methods of improvement of labour productivity.

Keywords: Construction Site, labour, productivity and material) are determined by the market price and price and are, consequently, beyond the influence of project management. Labour cost in construction industry is estimated to be about 33%- 50% of the entire project cost. Because Labour is more variable and unpredictable than other project-cost components, it becomes necessary to understand the effects of different factors on Labour productivity. An increase in productivity can reduce the Labour cost in a direct proportion. It can either benefit or reduce a project's profit, making it of vital interest to the construction industry for its success.

Labour Productivity rate measurement could be used in improving Labour productivity construction sites and determines the required resources to execute the activities of the projects and required duration to carry these

III)RESEARCH BACKGROUND :

1. **Shashank K, (2015) reported:-** This research paper addresses how Productivity plays an important role in the construction industry. It helps construction industries to be competitive, to achieve goals and to meet the stakeholder and value propositions. The objectives of this research are; one, identifying the key factors affecting the variation of Labour productivity in the construction projects in Bangalore, India, second, assessing the impact of the influenced factors on the variation of Labour productivity and lastly, providing recommendations to reduce the variation

of Labour productivity. The above objectives have been achieved through the analysis of 53 questionnaires and the result of this analysis shows that, there are six main groups which have significant impact on the Labour productivity variation in the construction projects. They are Manpower group, Managerial group, Motivation group, Material/Equipment group, Safety group and Quality group.

2. Mostafa E., Shehataa., Khaled M. El-Gohary (2011):- This paper focuses on Labour productivity in the construction industry. This study considers the current state-of-the-art issues relevant to this subject. It covers the construction Labour productivity definitions, aspects, measurements, factors affecting it, different techniques used for measuring it and modeling techniques. The main outcome from the literature is that there is no standard definition of productivity. This study provides a guide for necessary steps required to improve construction Labour productivity and consequently, the project performance. It can help improve the overall performance of construction projects through the implementation of the concept of benchmarks. Also, it gives an up to date concept of loss of productivity measurement for construction productivity claims. Two major case studies, from the literature, are presented to show construction Labour productivity rates, factors affecting construction Labour productivity and how to improve it.

3. Ninatubu M. L. (1996) This research aimed at investigating strategies for construction performance improvement in Tanzania. The research established that the Total Quality Management (TQM) philosophy provides a feasible long term performance improvement strategy. Benchmarking was identified as a tool for initiating and sustaining the TQM program. Labour productivity was selected as the key construction performance indicator. A framework for Labour productivity benchmarking was developed, on the basis of current mean productivity (CMP) and target mean productivity (TMP). Construction Labour productivity at macro-economic level and site level were also investigated.

4. Cortinas D. B. (1991) This research aimed at On-site construction productivity improvement through application of Deming's PDCA cycle. The research states various the Total Quality Management (TQM) fundamentals. Labour productivity was selected as the key construction performance indicator. For which data is gathered by using daily time cards in which Labours working hours excluding its lost time due to

various reasons was recorded which enable to find out true unit rate of production of each individual Labour. Then analysis of these data was done by using various statistical tools and solutions to improve Labours productivity planned.

5. Attar A. (2008) This paper focuses on Labour productivity in the construction industry. It covers the construction Labour productivity definitions, aspects, factors affecting it. The main outcome from the literature is that there is no standard definition of productivity. This study provides guidelines for necessary steps required to improve construction Labour productivity. The productivity of Labour is particularly important especially in developing countries, where most of the building construction work is still on manual basis. This paper reports on a survey made on project managers and experienced engineers of building projects in Sangli, Kolhapur & Pune districts, where an increase in productivity is being sought. Respondents were required to rate using their experience how all factors affect productivity with respect to time, cost and quality. The survey was carried out by a questionnaire and responses. The ten most significant factors affecting Labour productivity for small, medium and large companies are identified.

6. Paul Chan (2008) The research reported in this paper forms part of an ongoing Ph.D. study into the issue of construction labour productivity. An earlier study highlighted that less than 50% of the industry actually actively measure and monitor productivity levels, with a majority of those companies that claim to measure go about measuring on the basis of the intuition of key site management personnel. This may seem alarming; however, it was argued that productivity measurement techniques could be perceived as theoretical, arduous and expensive for construction companies to adopt. This paper reviews the methods of productivity measurement available and describes two case studies conducted during this research, with a view of reporting the problems and issues faced when attempting to establish productivity levels at a project level. Lessons learnt are then drawn from the experience.

7. Tarek E. The objective of research is to address the characteristics of the Egyptian construction industry; and to address the issue of applying TQM in the construction industry and present two case studies: a local contractor Japanese one. The interviews with the management representatives of two contractors working in Egypt. They develop a framework for implementing it in Egyptian construction.

8. Rumane A.R. (2009), reported:-This book covers every tools and techniques used for implementation of TQM in construction industry. Such as Quality classic tools (e.g. control chart, flow chart, check sheet etc.)Management and planning tools (e.g. activity network diagram, tree diagram etc.)Process improvement tools (e.g. six sigma, root cause analysis etc

9. Deffenbaugh L. R (1993) This paper addresses a major challenge in implementing TQM in construction industry is applying its principle on the jobsite. For years TQM has been readily applied to manufacturing, in which work is repetitious and the workforce is generally stable. Construction, however, offers much more variability; each project represents a unique formula of design, location, personnel, materials, weather, cost, and time. Meeting this challenge is a new process called Jobsite Quality Planning in which TQM tools and techniques are used to arrive at a common project mission by specific objectives. Following the quality principles of customer satisfaction, respect for people, management by fact, and continuous improvement, a quality lead team puts its unique plan into action. It on recognition, quality teams, quality indicators, and training and development. In working the plan, momentum is built toward a project on which everyone wins. When this happens, the project can be described as truly a total success.

10. Chase G. W (1993) :- This paper presents a 10-element total quality management (TQM) process that includes the common elements found in the TQM processes being used by design and construction companies. The model draws on two primary sources--i.e., three workshops conducted by Iowa State University on the application of TQM to the design and construction of buildings, and continuing study by the writer of design and construction companies practicing TQM. The 10 elements include: (1) Upper-management involvement, commitment, and leadership; (2) vision, mission, and guiding principles, developed in concert with the employees of an organization; (3) a significant amount of training in quality awareness, communication, leadership, teamwork, process improvement, and job-related skills; (4) improved communications; (5) teamwork; (6) a focus on satisfying the customer; (7) a focus on improving the work environment, helping employees improve, and involving them in the improvement efforts of the organization; (8) the use of formalized process improvement techniques; (9) helping suppliers and subcontractors Improve; and (10) striving for continuous improvement.

11. Dam R.H (2010) :- This research report investigates Total Quality Management as management tool that can be employed by construction companies to increase the level of quality employed on construction projects. The author states the advantages and disadvantages of total quality management in construction. This paper also focuses on basic elements of TQM, Tools for TQM, importance of training for top & middle management for successful implementation of TQM. The researcher develops a framework "how to implement TQM in roads construction?" after carry out questionnaire survey by developing questionnaires from extensive literature survey that is carried out.

12. Abweh F. D.(2009) The purpose of this research is to study the productivity rates on construction projects and the role of project manager to improve the productivity rates by highlighting the techniques that can be used and applied to achieve a noticeable difference in the productivity.Literature review is conducted through referred researches and journals to show different findings and theories related to the productivity rates and the methods of improvement. And then research instruments were used such as work sampling and interviews in order to reach to the final discussions and conclusions.The study shows that the productivity rates of the construction workers vary from one project to another, taking into consideration the type of the activity to be carried out and the surrounding work environment. However, the study also highlights how the project manager can intervene in order to improve the productivity of his workers.

13. Gundecha M. M. (2012) The aim of this paper is to identify factors affecting Labour productivity at a building construction project. A literature review and factors recommended by experts were considered to categorize the factors. 40 factors, categorized into 5 groups, were analyzed and ranked considering Relative Importance Index. The questionnaires were distributed to Project Manager, Project Engineer, Architecture, and Others (Scheduler, and Estimator) It was concluded, final cost of the projects were higher than estimated cost. It's recommended to develop human resources through proper and continuous training programs frame a strong assignment, vision and a planned approach to overcome the disturbances on the performance of the construction projects. The discussed factors are expected to assist in completing construction projects successfully.

14. Sweis R. J.(2009) reported:- This paper proposes a methodology to model the

variability of masonry Labour productivity. The theoretical basis of baseline productivity relied upon the analysis of 14 projects sharing similar exogenous conditions and being similar in scope, size of components, specifications, quality requirements and design features. The data were collected using standardized data collection procedures that focused on task-level Labour productivity; specifically, the measurement of work accomplished by a single crew in a single shift. Analysis showed that when daily productivity values fall between the control limits, loss of productivity is within normal variation while daily productivity values falling above the upper control limit imply a loss of productivity that is due to the work environment factors as within the normal variation, and in particular to certain significant influential factors that can be cited during that day. These results could have significant implications for construction managers seeking to improve overall project performance.

15. Mostafa Z. A.(2003) The purpose of this research is to study "measurement of Labour productivity in the construction industry in the Gaza Strip". The main objectives of this study are to gain understanding of the factors affecting Labour productivity in buildings construction and measuring Labour productivity of block work operation in the Gaza Strip. The objectives of this research have been achieved through a study of seventy –six questionnaires and a case study in the Gaza Strip. The results of analysis of 45 factors considered in the questionnaire concluded that the main factors negatively affecting Labour productivity in buildings construction

16. Ghoddousi P. (2015) This paper considers the Theoretical Model of International Benchmarking for Labour Productivity (TMIBLP) as one of the most popular methods to measure the productivity of Labour in performing on-site activities. Drawing upon a critical review of the literature this study presents a framework to improve the effectiveness of TMIBLP. Afterwards, the study describes the procedure for benchmarking on-site construction activities deploying the proposed framework. The data were collected from steel structures erecting activities in six building projects in Tehran, Iran. The discussions will present practical guidelines for construction project managers regarding benchmarking Labour productivity. The paper concludes with putting forward some suggestions for future research opportunities.

IV) CONCLUSION:

Productivity remains as one of the most elusive concepts in business and economic literature. It remains elusive because of a lack of definitive theoretical work –mainly at the firm level. However, the ever-rising customer requirements and expectations have increased demands for continually introducing improvements in the cost, timing and quality of the construction output. As world competition intensifies, leading construction organizations throughout the world continue to be more active in enhancing their competitive position by improving their performance. Thus, setting new operating targets and standards for national markets, this dynamic mechanism and the well-known fierce national competition have raised the awareness of performance measurement (benchmarking) among the majority of construction organizations. Project performance indices or Benchmarking indices such as the disruption index (DI), performance ratio (PR), project management index (PMI) are calculated. The role of project personnel to improve the productivity rates by highlighting the techniques that can be used and applied to achieve a noticeable difference in the productivity were identified by taking interviews.

REFERENCES:

- [1]. Attar A. A, Prof. Gupta A.K., Prof. Desai D.B. "A Study of Various Factors Affecting Labour Productivity and Methods to Improve It", IOSR Journal of Mechanical and Civil Engineering (IOSR-JMCE) ISSN: 2278-1684, PP: 11-14.
- [2]. Abweh F. D.,(2009) "Improving Labour Productivity on Construction Projects"
- [3]. Chase G. W, (1993)"Effective total quality management (TQM) Process for construction",ASCE Vol. 9, No. 4.
- [4]. Cortinas D. B. (1991)"On-site construction productivity improvement through total quality management",
- [5]. Dam R.H.(2010),"Total quality management: What is it and how can it be implemented in roads construction?"
- [6]. Deffenbaugh L. R,(1993)"Total quality management at construction jobsite", ASCE journal vol. 9, journal 4.
- [7]. Ghoddousi P., Alizadeh B., Hosseini M.,Chileshe N.,(2014) "Benchmarking Labour productivity in performing on-site activities: lessons for construction project managers", third international scientific

- conference on project management in the Baltic countries.
- [8]. Gundecha M. M. (2012) "Study of factors affecting Labour productivity at a building construction projects in the USA: web survey.
- [9]. 9. IS-7272 (1974): Recommendation for Labour output constants for building work.
- [10]. Mostafa Z. A. (2003) "Study of the measurement of Labour productivity in the Palestinian construction industry: the Gaza strip"
- [11]. Mostafa S., Khaled M. (2011) "Towards improving construction Labour productivity and projects' performance", Alexandria engineering journal.
- [12]. Ninatubu M. L. (1996) "Construction Labour productivity analysis and benchmarking - the case of Tanzania"
- [13]. Chan P., Kaka A., "Construction productivity measurement: a comparison of two case studies.
- [14]. Rumane A.R. (2008), "Quality tools for managing construction projects" pg no. 26-45.
- [15]. Shashank K., Dr. Hazra S., Pal K. N. (2008) "Analysis of key factors affecting the variation of Labour productivity in construction projects" International Journal of Emerging Technology and Advanced Engineering, Volume 4, Issue 5.
- [16]. Sweis R. J., Sweis G. J., Hammad A. A., Rumman M. "Modeling the variability of Labour productivity in masonry construction", Jordan Journal of Civil Engineering, Volume 3, No. 3, 2009, PP-197-211.
- [17]. Tarek E. and Tomoya S.(2008)"total quality management implementation in the egyptian construction industry" journal of management in engineering © ASCE