iJRASET
International Journal For Research in Applied Science and Engineering Technology

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 9 **Issue:** VI **Month of publication:** June 2021

DOI: https://doi.org/10.22214/ijraset.2021.35459

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International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.429
Volume 9 Issue VI Jun 2021- Available at www.ijraset.com

An Investigation on Factors affecting Construction Productivity

Ajit Ambekar[1], Prof. A. M. Ingle[2], Prof. Syed Sabihuddin[3]
[1]*P.G. Student, Department of Civil Engineering, Prof Ram Meghe College of Engineering and Management, Amravati, Maharashtra, India*
[2]*Assistant Professor, Department of Civil Engineering, Prof Ram Meghe College of Engineering and Management, Amravati, Maharashtra, India*
[3]*Associate Professor, Department of Civil Engineering, Prof Ram Meghe College of Engineering and Management, Amravati, Maharashtra, India*

Abstract: Productivity is important in construction. Construction productivity is a significant part of production for construction projects. In the construction industry, many external and internal factors are never constant and difficult to predict. This factor leads to a constant change in productivity. It is necessary to make sure that the reduction of construction productivity does not affect the plan and work schedule and does not cause delays. The consequences of these delays can lead to serious loss of money. In addition, significant costs can be saved if productivity is improved, as the same work can be done with less labor, thereby reducing the total cost of construction.

Keywords: Construction, productivity, management and organization.

I. INTRODUCTIO

The term "productivity" expresses the relationship between outputs and inputs. Output and input vary from one industry to another. Also, the definition of productivity changes when applied to different industries of the same industry. Work is one of the main requirements in the construction industry. Labor productivity usually links labor in terms of labor costs to the number of products produced. In other words, the definition of labor productivity is the number of goods and services produced by the production factor (labor force) per unit time. In 1883, Littre defined productivity as a "faculty for production", ie a desire to produce. In 1950. The Organization for European Economic Cooperation (OEEC) presented the definition of productivity as a factor obtained by dividing production into one of the factors of production (Sumanth, 1984). Depending on the measurement objectives and the availability of the data, there are several definitions of performance. The US Department of Commerce has defined productivity as "production dollars per person-hour of labor input.".

II. REVIEW OF LITERATURE

Productivity is the result of several interrelated factors. The following discusses the various factors that affect productivity, and they are reviewed in previous studies.

Time: There are many tasks during construction projects that cause loss of productivity. Past research shows that productivity decreases overtime. The most commonly stated reasons are fatigue; increased absenteeism; reduction of morals; reduction of supervision efficiency; poor work, which leads to higher processing; increase in accidents (Lema N. 2002). Working overtime initially leads to increased production, but continued overtime can lead to increased costs and reduced productivity. The time used by the construction worker in the production activity is about 30% of the total available time. An employee in this field works only for 3.5 hours after the 8-hour shift and spends 20% of his time on direct value-added activities (Moore, D. et al 2003).

Schedule Compression: When there are early delays in a project, compressing the overall time period for follow-up is often a way to compensate for breaks and perform the assigned task on schedule. In terms of professional planning, scheduling can be possible without accelerating individual work, using a float in the overall project schedule. However, in many projects the schedules are not fully loaded with resources. As a result, a properly updated schedule reflecting delays can show the completion of the project in a timely manner without reducing individual activities. Compression of the schedule may result in the contractor being able to obtain additional work for the desired task due to a reduction in the total duration, which will allow the contractor to perform the total number of remaining works. Schedule-related overtime often results in large productivity losses due to a lack of material or additional labor support equipment, leading to difficulties in planning and coordinating tasks and the unavailability of experienced workers (Ugwu, O. O., et al 2007).

III. METHODOLOGY

In this study, the data collection process consists of two stages. The first stage is an interview, and the second is a performance survey on the work interface. This chapter introduces the goals, development and organization of two stages of data collection. The nature of goals and participants is also being developed.

A. *Interview*

Due to the literature review, general unproductive measures and their possible causes were mainly identified. Waste sources were related to the design, material, crew, equipment and site elements, as shown below :

a) Expecting equipment through its occupation
b) Waiting for equipment through installation
c) Expectations due to equipment failure
d) Expectations due to unsuitable tools
e) Expectations due to tool failure
f) Expectations due to delivery delay
g) Expectations due to underestimation of the necessary materials
h) Expecting materials due to inventory problems
i) I am waiting for instructions
j) Expectations of drawings
k) Recycling due to design error
l) Recycling due to design change
m) Recycling due to design omissions
n) Recycling due to field error
o) Expectations through an overloaded site
p) Expectations due to crew intervention
q) Idle due to lack of work enthusiasm
r) Expectations through wet days

An interview was conducted to demonstrate the validity of these causes of waste resulting from the inspection and the compliance of the local construction market.

1) *Purpose and Result of the Interview:* In order to get a complete picture of the actual situation during construction work and to identify waste on site and the causes of this waste, interviews were conducted at different levels of professionals. The advantage of involving different levels is that the issue can be resolved through a different position, and thus the concealment of information by certain persons has less impact on the outcome. Respondents were asked to determine whether waste was common in the list of questions (as shown in Appendix). Almost all respondents gave positive answers to these causes of waste. In addition, some respondents suggested adding "night lighting expectations" to the category of "equipment", because during the night shift the lack of sufficient lighting or delay in providing lighting always affect the course and performance of the site. In addition, according to the weather feature in Singapore, a few respondents said that "wait for wet days" also happens quite often and delays work on site. Based on the literature review and the above feedback, the waste was classified as recycling, waiting and idling. The latter differs from expectations to emphasize the lack of a source associated with the process. Based on the results of the literature review and the interview, a list of waste sources was summarized. Waste sources were related to the design, material, crew, equipment and site elements.

2) *Equipment*

a) Expecting equipment because of its occupation
b) Waiting for equipment through installation
c) Waiting for equipment failure
d) We are waiting for lighting on night work tools
e) Expectations through unsuitable tools
f) Expectations due to tool failure Material
g) Expectations due to delivery delay

h) Expectations due to underestimation of the necessary materials
i) Expectations of materials due to problems with stocks Information
j) I'm waiting for instructions
k) I'm waiting for a check
l) Expectations of drawings Variation
m) Recycling due to a design error
n) Recycling due to design change
o) Recycling due to design omissions
p) Recycling due to an error on the ground
q) Expectations through the overloaded site Sequence
r) Expectations due to the intervention of Labor crews
s) Single due to lack of enthusiasm for work

3) Weather
a) Waiting through wet days

B. Review

The objectives of the survey are
1) Capture background information about the studied projects, such as management and organizational features.
2) Tracking the effectiveness of projects on the site.

IV. CONCLUSIONS

This study is designed to identify the causes of probable factors that affect productivity in building construction. This study examines all possible factors through a structured questionnaire used throughout India. The results of the survey are analyzed, and the ranking of factors is calculated using a relatively important indicator. The main ideas of the study are to study various factors that affect labor productivity in construction.

Forty factors considered for the study were classified by the workforce of five different groups, external, communication, resource, and different groups. The target groups in this study were construction specialists.

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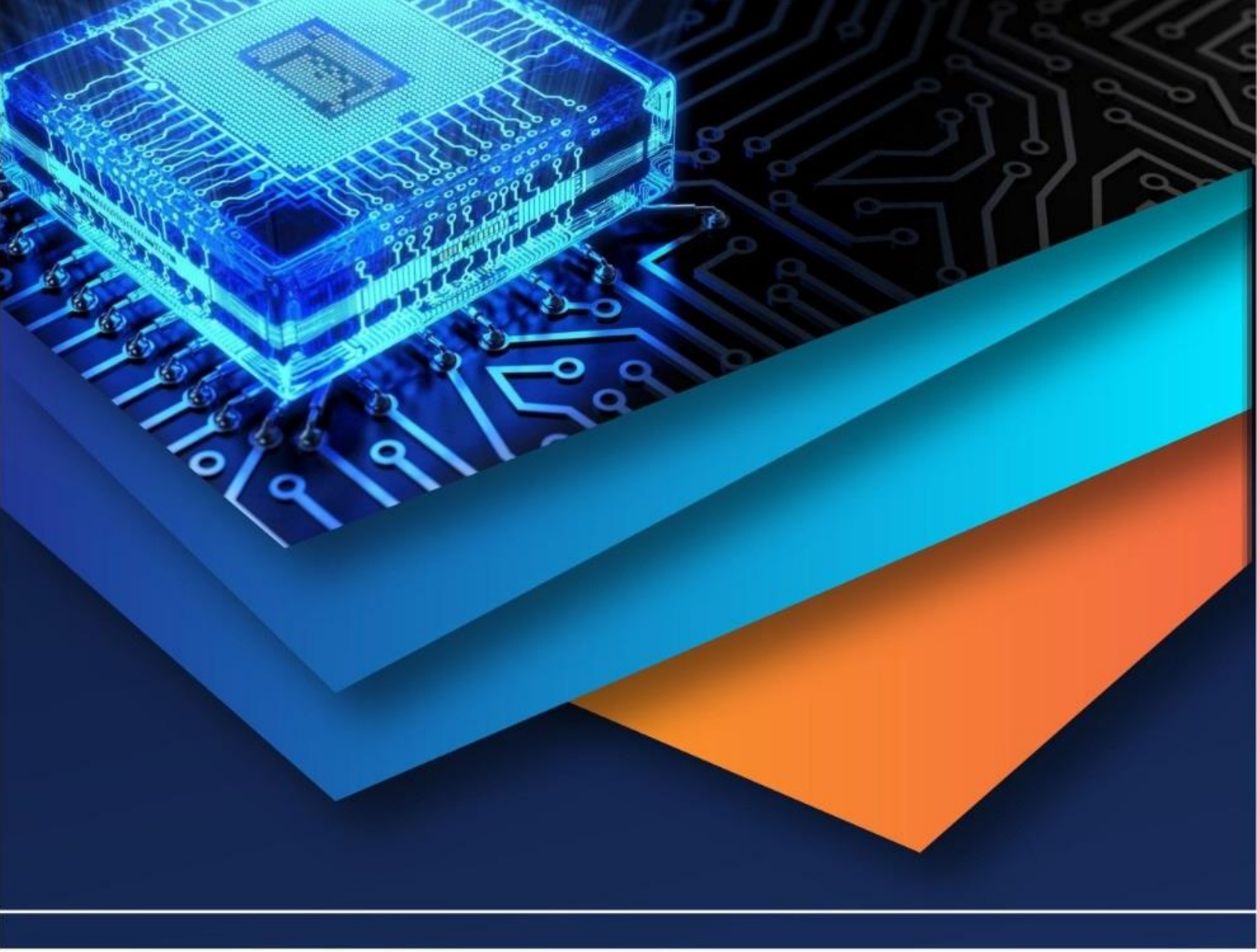

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