

PRODUCTIVITY IMPROVEMENT IN CONSTRUCTION INDUSTRY

Sneha Jamadagni¹, Prof.B.V.Birajdar²

¹M.E.Civil (Construction and Management) Engineering Student, Department of Civil Engineering

²Head of Department of Civil Engineering

^{1,2}Tatyasaheb Kore Institute of Engineering and Technology, Warananagar, Tal- Panhala, Dist-Kolhapur, Maharashtra, India-416113

Abstract: Labor productivity is at the forefront of concerns facing professionals in the construction industry worldwide. This study highlights the factors affecting labor productivity of the Construction industry. A questionnaire was used to gather the relevant data from members of Kolhapur's builders. It involved ranking 38 predefined factors divided into 4 categories; Human/Labor, External Management and Technological. The relative importance of indices (RII) was determined and the factors were ranked. The top fifteen factors affecting construction labor productivity are: clarification in technical specification, working overtime, labor fatigue, delay in payment, unavailability of suitable tools, extents of variations/ change order during executions, incentive scheme, labor supervision, method of construction, lack of construction manager leadership, labor skill, lack of training offered to operatives, layout of site, recognition program, communication between site management and labor. Recommendations have been made in the study to address these factors.

Key words: labor, productivity, construction.

1.Introduction

In construction industry labor costs accounts for 30-60% of the total cost of the project (Gomar et al. 2002; Hanna et al. 2002). So that labor productivity is important in the most of the construction projects. The labor performance is affected by many factors such as time, quality and cost in construction industry. For achieving good productivity skilled manpower, availability of material, availability of equipments and better management at construction site is required. Now a day's construction industry facing many problems of labor productivity. So that, the aim of study is identify the factors which are affected on labor productivity and evaluate them.

1.1 Factor Affecting on Labor Productivity: Thirty eight factors identify by literature survey, which affected labor productivity are classified under the four primary groups (1) Human/Labor Group (2) External Group (3) Technological Group (4) Management Group.

Human / labor group
1. Labor Fatigue
2. Labor Skill
3. Availability of Experienced Labor
4. Labor Motivation

EXTERNAL GROUP
1. High/Low Temperature
2. Sandstorms
3. Rain
4. High Humidity
5. High Winds

MANAGEMENT GROUP
1. Unrealistic Scheduling and Expectation of Labor Performance
2. Incentive Scheme
3. Labor Interference and Congestion
4. Storage Locations
5. Communications between Site Management and Labor
6. Sequence of Work
7. Late Arrival, Early Quit and Frequent Unscheduled Breaks.
8. Lack of Construction Manager Leadership
9. Delay in Payment
10. Method of Construction
11. Labor Supervision
12. Lack of Recognition Program
13. Unavailability of Suitable Tools
14. Delay in Inspection by Site Management
15. Material Shortage
16. Lack of Training Offered to Operatives
17. Lack of Periodical Meeting with Crew Leader
18. Lack of Suitable Rest Area Offered to labor on Site
19. Crew Size and Composition
20. Working Overtime
21. Lack of Providing Labor With Transportations

TECHNOLOGICAL GROUP
1. Clarification in Technical Specifications
2. Team Spirits
3. Delay in Responding to Requests for Information's
4. Rework
5. Delay in Inspection by the Engineer
6. Site Restricted Access
7. Extents of Variations/Change Order During Executions
8. Layout of Site

2. METHODOLOGY

The questionnaire survey was carried out in the various constructions projects. The Questionnaire having two parts. First part consists of general information of project party. Second's part consists of factors affecting labor productivity in the four different groups. The groups are management group, technological group, human/labor group and external group. For analyzing data, the relative importance technique (RII) is used.

3. QUESTIONNAIRE DESIGN

The design of questionnaire is very simple and under stable for respondents. The advantage of questionnaires is in smaller timing getting more accuracy in final outcome. Factors affecting the productivity of construction were identified through literature survey. the questionnaire required the respondents to rank factors affecting the labor productivity with the scale the rating of '1' representing very low effect; '2' representing low effect; '3' representing medium effect; '4' representing high effect; '5' representing very high effect.

4. DATA ANALYSIS

During the questionnaires survey 25 construction industries have respondents. The Relative Importance Index (RII) was used to decide various professionals' opinions of the RII in construction projects. RII is calculated as stated below:

$$RII (\%) = \left[\frac{5n_5 + 4n_4 + 3n_3 + 2n_2 + 1n_1}{5(n_1 + n_2 + n_3 + n_4 + n_5)} \right] * 100$$

The five-point scale ranging from 1 (less effective) to 5 (highly effective) is adopted and it is transformed to relative importance indices (RII) for each factor as follows:

Where,

n1= number of respondents who selected factor for very low effect

n2= number of respondents who selected factor for low effect

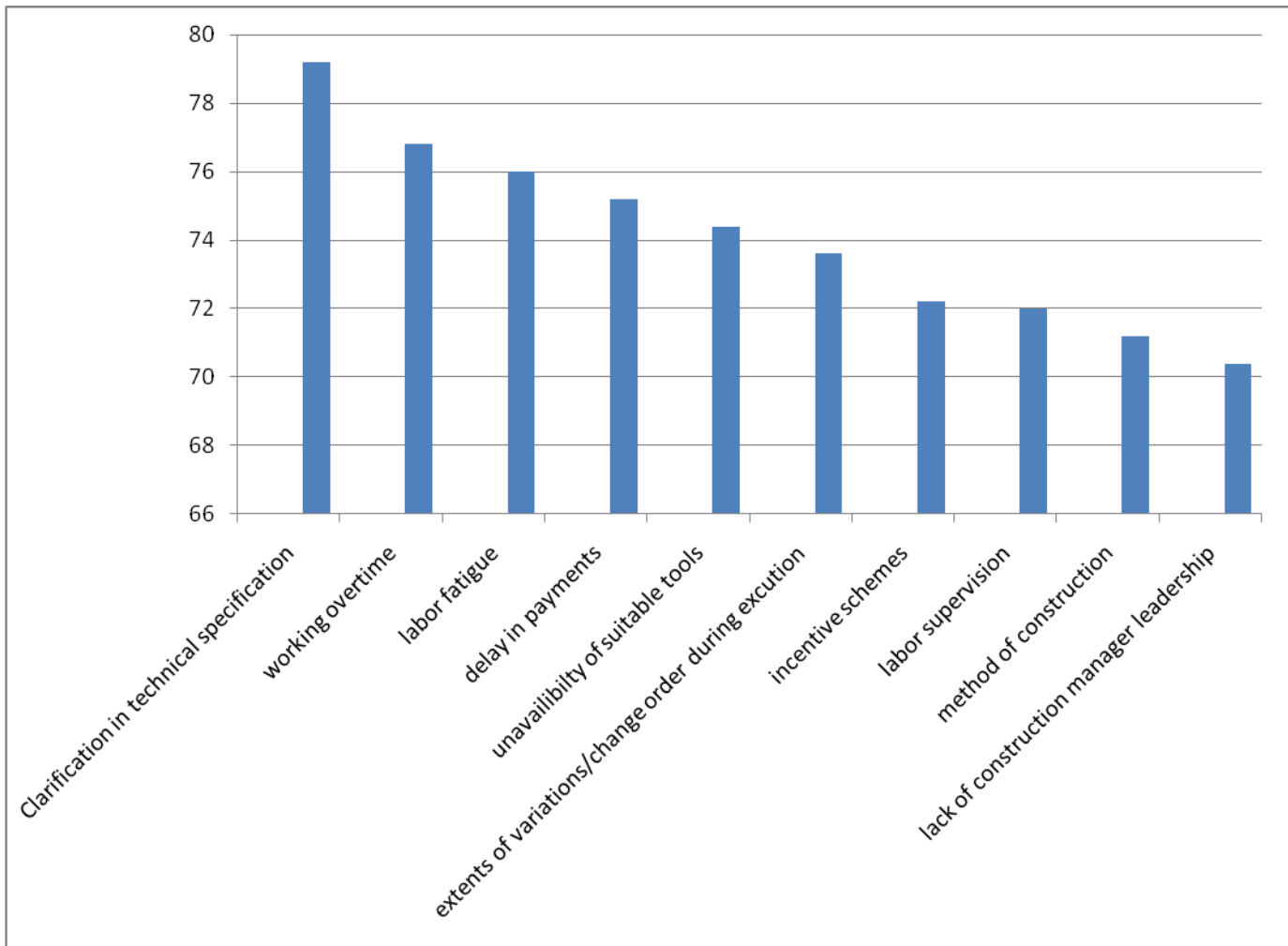
n3= number of respondents who selected factor for medium

n4= number of respondents who selected factor for high effect

n5= number of respondents who selected factor for very high effect

5. RESULTS

Rank	Factors	R.I.I.(%)
1	Clarification in technical specification	79.2
2	Working overtime	76.8
3	Labor fatigue	76
4	Delay in payments	75.2
5	Unavailability of suitable tools	74.4
6	Extents of variations/change order during executions	73.6
7	Incentive scheme	72.8
8	Labor Supervision	72
9	Method of construction	71.2
10	Lack of construction manager leadership	70.4



6. CONCLUSION

1. The clarification in technical specification factor ranked 1st among the 38 factors having R.I.I value is 79.22%. It is important factor in productivity. Every work should be clearly specified.
2. Working overtime factor ranked 2nd among the 38 factors having R.I.I value is 76.8%. Working of labor should not be more than 40 Hours per week and not more than 8 hours per day. After the 8 hours efficiency of labors decreases and which affects on productivity.
3. Labor fatigue factor ranked 3rd among the 38 factors having R.I.I. value is 76%. After 8 hours labor is not present on site mentally. For decreasing labor fatigue another group of labor appointed and it helps for increasing productivity.
4. The delay in payment factor ranked 4th among the 38 factors having R.I.I. value is 75.2%. Payment strictly done on time which helps for increasing productivity.

5. Unavailability of suitable tools factor ranked 5th among the 38 factors having R.I.I. value is 74.4%. All tools and equipments must be present on site for increasing productivity.
6. Extents of variations/change order during executions factor ranked 6th among the 38 factors having R.I.I value is 73.6%. after the completion of whole plan, work will be start. It helps for increasing productivity.
7. Incentive scheme factor 7th among the 38 factors having R.I.I. value is 72.8%. It is most important factor. It creates high level of motivations and satisfaction among labor. It helps for increasing productivity.
8. Labor Supervision factor 8th in among the 38 factors having R.I.I value is 72%. Proper and neatly supervision increases productivity.
9. Method of construction factors 9th among the 38 factors having R.I.I. value is 71.2%. the method of construction in a such a way that the labor should be completed all work within time. Due to this productivity should be increased.
10. Lack of construction manager leadership factor 10th among 38 factors having R.I.I. value is 70.4%. Every group of labor should be one leader. He is responsible for competing all work within time. It helps for increasing productivity.

ACKNOWLEDGEMENTS

I wish to express my thanks to Professor B.V. Birajdar (Guide and Head of Civil Engineering Department), for the input he has given during the preparation of this work. I wish to express my sincerely thanks to Dr. S.V. Anekar, Principal, Tatyasaheb Kore Institute of Engineering and Technology, Warananagar, who contributed with important supervision in thesis preparation and for supporting me to do this dissertation work. I acknowledge with thanks to faculty, teaching and non-teaching staff of the department, Central library and Colleagues.

REFERENCES

1. Brent G. Hicksona and Leighton A.Ellis, Factors affecting Construction Labor Productivity in Trinidad and Tobago, The Journal of the Association of Professional Engineers of Trinidad and Tobago ISSN 1000-7924 Vol.42, No.1, pp.4-11
2. Khaled Mahmoud El-Gohary, M.Eng.; and Remon Fayek Aziz, Ph.D., Factors Influencing Construction Labor Productivity in Egypt, J. Manage. Eng. 2014.30:1-9
3. Benviolent Chigara_ and Tirivavi Moyo Factors Affecting Labor Productivity on Building Projects in Zimbabwe, International Journal of Architecture, Engineering and Construction Vol 3, No 1, 57-65
4. Mistry Soham, Bhatt RajivCritical, Factors Affecting Labor Productivity In Construction Projects: Case Study Of South Gujarat Region Of India International Journal of Engineering and Advanced Technology (IJEAT) ISSN: 2249 – 8958, Volume-2, Issue-4