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Factors affecting labour productivity over construction sector

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Abstract - *The measure of the rate at which work is performed is called "productivity". It is a ratio of production output to what is required to produce it. The measure of productivity is defined as a total output per one unit of a total input. In construction, the output is usually expressed in weight, length, or volume, and the input resource is usually in cost of labor or man-hours. There are many standards available in the construction industry for contractors as reference values for purposes of construction cost estimation. These standards may vary in values but most are similar in principle. There are many factors that affect the productivity of labor in construction. Here are some of the most recognized factors affecting labor productivity in the industry Worldwide construction industry faces challenges regard to problems associated with productivity and the problem are usually linked with performance of the labour. Productivity assists the construction industries to be competitive, to achieve the objectives and to meet the stakeholder's expectation. The aim of this paper is to identify and rank the relative importance of factors recognized to affect the labour productivity on construction sites. To achieve this objective, various professionals such as Project Manager, Site Engineer, Architect and other who work on the different level, were invited to participate in the online survey. In questionnaire, factors were divided into 9 groups such as (1) workforce; (2) management team; (3) psychological; (4) schedule compression; (5) material/equipment; (6) supervision; (7) safety; (8) miscellaneous; (9) external. After the analysis of questionnaire, top ten factors which affect labour productivity in construction are: (1) Lack of skill and experience of the workers; (2) Late payment; (3) Poor health of the workers; (4) Low amount of pay; (5) Lack of empowerment; (6) Poor work planning; (7) Design changes; (8) Lack of labour safety; (9) Poor condition of equipment/tools; (10) Ignore safety precautions. The results obtained can be used by the professionals for improving the labour productivity in construction projects.*

Key Words: NES, CBWE, ILA, NATRASS, VVGNLI

1. INTRODUCTION

Construction is a labour intensive industry and productivity of the labour is one of the most significant factors which affect the overall performance of any organization, since labour cost comprises 30-40% of the overall project's cost. The output of the construction sector constitutes one half of the gross capital and 3 to 8% of the Gross Domestic Product (GDP) in most countries. The construction industry in India contributes to over 5% of the Nation's Gross Domestic Product and employs over 30 million people (Planning Commission 2008). Labour productivity constitutes major part of production input in construction projects, many factors are varying at immeasurable rate and are difficult to foresee. It is inevitable to make sure that reduction in productivity does not affect the scheduled work and cause delay in the project. Thus, identification of the factors affecting labour productivity at micro level is important, since considerable cost can be reduced if productivity is improved because the similar work can be done with less manpower, thus reducing the overall labour cost (Thomas 1991). The main objective of this paper is to identify and rank the relative importance of factors recognized to affect the labour productivity on construction sites.

2. METHODOLOGY

Online survey was carried out among the various construction professionals such as Project Manager, Project Engineer, Assistant Project Manager, Assistant Project Engineer, Site Engineer, Architect and other who work on project from management level to operational level. The questionnaire consists of three parts. First part consists of the general information of the company. Second part consists with set of questions targeting the factors affecting labour productivity in the 6+nine different groups that is the (1) workforce group; (2) management team; (3) psychological group; (4) schedule compression group; (5) material/equipment group; (6) supervision group; (7) safety group; (8) miscellaneous group; (9) external group. Third part consists of the respondent's information. The responses collected were based on the understanding, knowledge and experience of the respondents and not related to any particular construction project. Table 1 shows the list of factors considered for the study.

Data Analysis

On completion of the online survey ,108 professionals from the various construction industries have responded. Some researchers are of the opinion that mean and stand and deviation of individual factor is not a suitable measure to assess global; ranking as they do not a suitable measure to assess global ranking as they do not reflect any relationship between them .So the technique used to analyzing data was the relative importance index (RII).The analysis involve the computation of weighted average or representative rating point for the collective rating made for each variable in the subset .Table 1 represent the scale used for representation of effect of different factors on labour productivity of effect of different factors on labour productivity used in the questionnaire.

In order to facilitate the study, after a number of literature reviews and personal interview with field professionals, a plan was formulated for collecting field information and creating an evaluation process and numerical values. relative importance index (RII)method used for analysis of the survey result.

Table 1 List of factors consider for the study

S. No	Factors	Group
1	Lack of skilled and experience of the worker	
2	Lack of empowerment	Workforce factor
3	High workforce a absenteeism	
4	Low commitment	
5	Increase of labour age	
6	Poor health of the worker	Management team
7	Bad leadership	
8	Poor site management	
9	Inadequate construction method	
10	Lack of labour surveillance	
11	Late payment	
12	Little or no welfare	Psychological
13	Low amount of pay	
14	Little or no financial rewards	
15	Inadequate lighting	
16	Unsafe working condition	safety
17	noise	
18	Ignore safety precaution	
19	Weather condition	miscellaneous

Table 2 Scale used for representation of effect

Type of Effect	Strongly agree	Agree	Disagree	Strongly Disagree	Don`t know
Scale	5	4	3	2	1
Factors	n5	n4	n3	n2	n1

R.I.I = (5(n5)+4(n4)+3(n3)+2(n2)+1(n1) * 100)/ S(n1+n2+n3+n4+n5)

Where

N5=number of respondents who selected for strongly agree

N4=number of respondents who selected for agree

N3=number of respondents who selected for disagree

N2=number of respondents who selected for strongly disagree

N1=number of respondent who selected for don`t know

RESULT AND DISCUSSION

Based on the relative important index (R.I.I) top ten factors affecting labour productivity in construction are presented in table2

Table 3 Top 10 factors affecting labour productivity

Rank	Factor	R.I.I	Related group
1	Lack of skilled and experience of the workers	86.48	Workforce group
2	Late payment	86.41	Psychological group
3	Poor health of worker	85.98	Workforce group
4	Low amount of pay	85.79	Psychological group
5	Lack of empowerment	84.67	Workforce group
6	Poor work planning	83.77	Schedule compression
7	Design change	83.55	External group
8	Lack of labour safety	83.20	Safety group
9	Poor condition of tools	83.01	Material group
10	Ignore safety precautions	82.96	Safety group

The lack of skills and experience of the worker factor rank 1 Among the 54 factors, having a R.I. I 86.48% .so it is the most important factor effecting the labour productivity constructions. lack of skills and experiences of worker became a cause disturbance in the work the work process. Specializations and expert in work define a worker to be skilled. in increasing demand of skilled labour due to use of technology at constructions site such as computerized machines and plant will increase labour productivity.

Late payment factor ranks 2

Among all the 54 factors with R.I.I. the exhaustion of the worker is due to long working hours poor health decreases the concentration son work, which directly reduces the productivity.

Low amount of pay factor rank 4.

With proper and suitable amount of pay psychologically motivates the worker. A monitory pay further promotes the objective of operatives and create a high level of motivations and satisfactions among them as a result high efficiency can be achieved.

Lack of empowerment factor with 84.67% R.I.I rank 5th. Empowerment is the act of identifying the task which labour is trusted too act independently versus those tasks the labour must get approval before proceeding empowering labour requires a great deal of trust by project manager.

Poor work planning factor ranked 6

With 83.77%R.I.I. Poor world planning may lead to lack of business support, poor estimates, poor scope control. Before actual work of project begins, spend time to define project objective, scope, assumption, risk, budget, timeline and overall approach.

Design changes factor ranked 7

Recognized significant impact of third factor on labour productivity are, insufficient duration imposed upon designers to develop and review design alternatives. Finalization of design should be made to avoid these constraints.

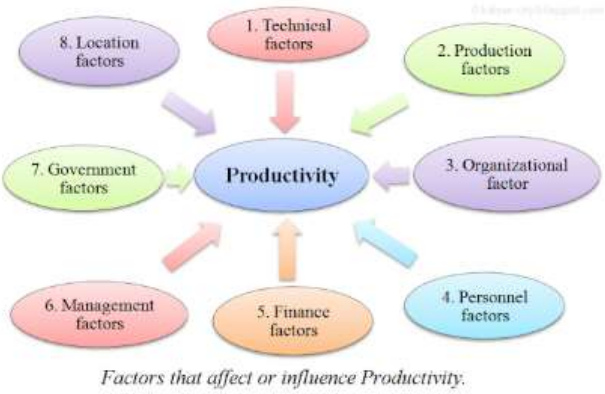

Fig -1: Productivity chart

1. **Technical factors**: Productivity largely depends on technology. Technical factors are the most important ones. These include proper location, layout and size of the plant and machinery, correct design of machines and equipment, research and development, automation and computerization, etc. If the organization uses the latest technology, then its productiveness will be high.

2. **Production factors**: Productivity is related to the production-factors. The production of all departments should be properly planned, coordinated and controlled. The right quality of raw-materials should be used for production. The production process should be simplified and standardized. If everything is well it will increase the productiveness.

3. **Organizational factor**: Productivity is directly proportional to the organizational factors. A simple type of organization should be used. Authority and Responsibility of every individual and department should be defined properly. The line and staff relationships should also be clearly defined. So, conflicts between line and staff should be avoided. There should be a division of labor and specialization as far as possible. This will increase organization's productiveness.

4. **Personnel factors:** Productivity of organization is directly related to personnel factors. The right individual should be selected for suitable posts. After selection, they should be given proper training and development. They should be given better working conditions and work-environment.

5. **Government factor**: They should be properly motivated; financially, non-financially and with positive incentives. Incentive wage policies should be introduced. Job security should also be given. Opinion or suggestions of workers should be given importance. There should be proper transfer, promotion and other personnel policies. All this will increase the productiveness of the organization.

6. **Finance factors**: Productivity relies on the finance factors. Finance is the life-blood of modem business. There should be a better control over both fixed capital and working capital. There should be proper Financial Planning. Capital expenditure should be properly controlled. Both over and under utilization of capital should be avoided. The management should see that they get proper returns on the capital which is invested in the business. If the finance is managed properly the productiveness of the organization will increase.

7. **Management factors**: Productivity of organization rests on the management factors. The management of organization should be scientific, professional, future-oriented, sincere and competent. Managers should possess imagination, judgment skills and willingness to take risks. They should make optimum use of the available resources to get maximum output at the lowest cost. They should use the recent techniques of production. They should develop better relations with employees and trade unions. They should encourage the employees to give suggestions. They should provide a good working environment and should motivate employees to increase their output. Efficient management is the most significant factor for increasing productiveness and decreasing cost.

3. CONCLUSIONS

In today`s world, the construction industry is rated as one of the key industry. It helps in developing and achieving the goal of society. Study and knowledge of constructions productivity are very important because the cause loses to the governing agencies and also influence the economics of the constructions industry. Prior knowledge of labour productivity during constructions can save money and time. Investments for these projects are very high because of the complexity in constructions. Various factors can highly effects overall productivity, thus the projects can end up adding even more time and money in order to be completed. This research is intended to identify the correlations between the variable and also the comparison between the factors of the laborer productivity in constructions with their

significance. The study investigates all the possible factors through structured questionnaires administrated all over Madhya Pradesh. The basic idea of the research is to study various factors effecting labour productivity on constructions.

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