

ASSESSMENT OF FACTORS AFFECTING THE LABOUR PRODUCTIVITY IN BUILDING CONSTRUCTION PROJECT

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Abstract: Labour productivity is one of the least studied areas within the construction industry. Productivity improvements achieve higher cost savings with minimal investment. 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. Due to the fact that profit margins are small on construction projects, cost savings associated with productivity are crucial to becoming a successful contractor. The chief setback to improving labour productivity is measured labour productivity. The main objective of this study is to find critical factors affecting labour productivity. A survey was carried out in south Gujarat region cities, on civil contractors. The above objectives have been achieved through the analysis of questionnaires and the result of this analysis shows that, there are 10 main groups which have significant impact on the labour productivity variation in the construction projects. They are Technological, Manpower group, Managerial group, Material/Equipment group, External group, Environmental group, Motivational group, Schedule group, Safety group and Quality group.

Keywords: labour productivity.

INTRODUCTION

Construction is the world's largest and most challenging industry. Human resource today has a strategic role for productivity increase of any organization, and this makes it superior in the industrial competition. With the effective and optimum uses of it, all the advantages supplied by the productivity growth can be obtained.

Construction is a key sector of the national economy for countries all around the world, as traditionally it took up a big portion in nation's total employment and its significant contribution to a nation's revenue as a whole. However, until today, construction industries are still facing number of problems regarding the low productivity, poor safety and insufficient quality. Labour productivity is simply defined as the amount of goods and services that a labourer produces in a given amount of time (Al-Saleh 1995). It is one of the very important issues in construction industry since it affects the time and cost performances of any construction project (Al-Saleh 1995). Liu and Ballard (2008) stated that labour productivity plays a critical role in determining the financial success of a project. In most of construction projects, labour costs account for be- tween

30 and 50% of a project's total cost. This reflects the high importance of this resource in construction industry, meaning that any improvement in labour productivity will contribute a high deal to the improvement of the overall productivity and consequently, the project performance. "While numerous construction labour productivity research studies have been undertaken, only a few have addressed the productivity issue in developing countries" (Enshassi et al. 2007).

Productivity is the one of the most important factor that affects overall performance of any small or medium or large construction industry. There are number of factors that directly affect the productivity of labour, thus it is important for any organization to study and identify those factors and take an appropriate action for improving the labour productivity. At the micro level, if we improved productivity, ultimately it reduces or decreases the unit cost of project and gives overall best performance of project. There are number of activities involved in the construction industry. Thus the effective use and proper management regarding labour is very important in construction operations without which those activities may not be possible.

LABOUR PRODUCTIVITY

Productivity can be defined in many ways. In construction, productivity is usually taken to mean labour productivity, that is, units of work placed or produced per man-hour. The inverse of labour productivity, man- hours per unit (unit rate), is also commonly used. Productivity is the ratio of output to all or some of the resources used to produce that output. Output can be homogenous or heterogeneous. Resources comprise: labour, capital, energy, raw materials, etc.

$$\text{PRODUCTIVITY} = \frac{\text{OUTPUT}}{\text{LABOUR COST}}$$

Horner and Talhouni stated "A popular concept in the USA, and increasingly in the UK, is the concept of earned hours. It relies on the establishment of a set of standard outputs or „norms“ for each unit operation. Thus, a number of earned“ hours are associated with each unit of work completed.”

“Productivity may then be defined as the ratio of earned to actual hours. The problem with this concept is in establishing reliable „norms“, for setting standards. It also depends on the method

Used to measure productivity, and on the extent to which account is taken of all the factors which affect it. At the project site, contractors are often interested in labour productivity. It can be defined in one of the following way

$$\text{PRODUCTIVITY} = \frac{\text{OUTPUT}}{\text{LABOUR COST}}$$

Or

$$\text{PRODUCTIVITY} = \frac{\text{OUTPUT}}{\text{WORK HOUR}}$$

There is no standard definition of productivity and some contractors use the inverse of above,

$$\text{PRODUCTIVITY} = \frac{\text{LABOUR COST/WORK HOUR}}{\text{HOUR}}$$

OUTPUT

In general, productivity signifies the measurement of how well an individual entity uses its resources to produce outputs from inputs. Moving beyond this general notion, a glance at the productivity literature and its various applications quickly reveals that there is neither a consensus as to the meaning nor a universally accepted measure of productivity. Attempts at productivity measurement have focused on the individual, the firm, selected industrial sectors, and even entire economies. The intensity of debate over appropriate measurement methods appears to increase with the complexity of the economic organization under analysis.

There are however, a number of different productivity measures that are commonly used. Choosing between them usually depends on the purpose of the productivity measurement and the availability of data.

Productivity measures can broadly be placed into two categories. Single factor, or partial, productivity measures relate a particular measure of output to a single measure of input, such as labour or capital. Multi-factor or total productivity measures (MFP) relate a particular measure of output to a group of inputs, or total inputs used. Productivity measures can also be distinguished by whether they rely on a particular measure of gross output or on a value-added concept that attempts to capture the movement of output. Of the most frequently used MFP measures, capital-labour MFP relies on a value-added concept of output while capital labour- energy- materials MFP relies on a particular measure of gross output.

FACTOR AFFECTING LABOUR PRODUCTIVITY

N O	CRITERIA	SUB CRITERIA	N O	CRITERIA	SUB CRITERIA
1	TECHNO LOGICAL		3	MANAGEMENT TYPE-A (MANAGEMENT)	
		Clarity of technical specification			Poor site management
		The extent of variation/change order During execution			Poor communication
		Coordination level among design disciplines			Misunderstanding between labour and supervisor
		Design complexity level			Lack of periodic meeting with labours Construction managers lack of leadership
		Rework			Lack of labour supervision

		Site lay out			Working over time
		Inspection delay/stringent by the engineer			Crew size and composition
		Site restricted access			Unsuitability of storage location
2	HUMAN/ LABOUR				Accidents as a result of poor site safety programme
		Lack of labour skills	4	TYPE-B MATERIAL/EQUIPMENT	
		Increase of labourer age			Material shortage
		Misunderstanding between labour and supervisor			Unsuitable material storage location
		Lack of periodic meeting with labours Construction managers lack of leadership			Old and inefficient equipment Tools and equipment shortages
		Proportion of work subcontracted			Lack of places for eating and relaxation
		Unrealistic scheduling and expectation of labour performance Shortage of materials	8	SCHEDULE	
		Construction method			Working 7 days per week without taking holiday
		Payment delay			Poor work planning
5	EXTERNAL				Overcrowding
		High/low temperature			Misuse of time schedule
		High humidity	9	SAFETY	

		High wind			Ignore safety precautions
		Rain			Accident
6	ENVIRONMENTAL				No safety engineer in site
		Weather changes			Insufficient lighting
		Project location			Working at high places
		Working with confined place	10	QUALITY	
		Large project size			Low quality raw materials
7	MOTIVATION				High quality of required works
		Payment delay			Quality inspection delay
		Non provision of transport means			
		Lack of financial motivation system			

GUIDELINES FOR IMPROVING THE LABOUR PRODUCTIVITY

- Properly training to the labourers
- Motivation to workers towards project completion
- Properly and in advance material procurement and management
- On time payment to the workers
- Systematic flow of work
- Properly , clearly & in time supervision
- Advance site layout
- Maintain work discipline
- Facilities to the labourers
- Clearance of legal documents before starting of work
- Systematic planning of funds in advance
- Premonsoon plan to avoid work stop
- Maximum use of machinery

ADVANTAGES OF HIGH PRODUCTIVITY

- Improved productivity
- Quality stability
- Short construction period

- High degree of design freedom
- Improvement of construction environment
- Safety of perimeter
- Reduction of cost
- Minimise project management
- Foster communication and co-ordination
- Reduce rework
- Improve quality.

DISADVANTAGE OF LOW PRODUCTIVITY

- Low profitability
- Downsizing and low morale
- Work avoidance and turnover
- Suffocating benchmarks and standards

RECOMMENDATIONS AND CONCLUSION

RECOMMENDATIONS:

Construction tasks are expensive and frequently cause in arguments and claims, which generally affects progress of construction projects. The environment of construction organizations should be suitable to implement projects with successful completion. In the construction industry, it is necessary to find the weaknesses of particular task in order to solve and overcome them. Mentioned below are the recommendations which were found to be important factors for improving labour productivity in the construction industry.

- Organizations should make sure there is enough lighting present at the construction sites which can indirectly reduce the number of accidents. Continuous safety training and meetings should be arranged to achieve better performance in labour productivity.
- Purchased material should be stored at appropriate location and should be easily accessible and close to constructed buildings to avoid wasting labour time for multiple handling materials.
- Absenteeism at work site can be reduced with inclusion of appropriate paid time off and vacations to all employees.
- Change orders and design error should be avoided as much as possible. These factors can be costly and time consuming if the work has been done.
- Complex design and incomplete drawings should be avoided and care should be taken to avoid confusion among the various construction agencies.

CONCLUSION

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 construction productivity are very important because they cause losses to the governing agencies and also influence the economics of the construction industry. Prior knowledge of labour productivity during construction can save money and time. Investments for these projects are very high and because of the complexity in construction, various factors can highly affect overall productivity, thus the project can end up adding even more time and money in order to be completed.

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