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EVALUATION AND ASSESSMENT OF CIVIL ENGINEERING CONSTRUCTION LABOUR PRODUCTIVITY OUTPUT IN PROJECTS EXECUTION (CASE STUDY OF SOME CONSTRUCTION PROJECT SITES)

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ABSTRACT

Labour productivity output in civil engineering construction projects is an important aspect of civil engineering profession world-wide over many centuries. The use of civil engineering construction materials plays 60% role, while labour productivity output take 40% of the construction projects execution in construction industry. This account for the reason why multi-national companies spend huge sum of money every year to train and retain labour work force that is being employed for daily execution of activities that are carryout within the organization. Understanding and dealing with the human elements at construction sites is the very essential unit for a better performance and working environment, especially in Nigeria where labour productivity output has less regards. This paper assess labour productivity in civil Engineering construction projects in Nigeria, factors affecting proper labour productivity output, and the way forward.

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INTRODUCTION

The objectives of this paper

The aim of this study is to appraise the attitude of construction companies towards labour productivity output by skill workers and also the quality of work performed by the skill workers daily in those companies.

Methodology for this paper

The methodology for this paper was carried out with full survey research visits to several construction companies located within Kwara state, where there are construction works on different high rise buildings owned by individuals, institutions and the government. Personal interviews were conducted with different skill workers both on full time and part-time basis on their performance and the wages that is

paid to them. Photographs were also taken on the different types of skill labour available on those construction sites. The treatment received by different skill workers (i.e. output and wages) served the basis for this paper.

Introduction

Labour productivity output in the construction industry can be mainly defined as the output per labour hour. Labour productivity is a measure of the overall effectiveness of a construction work in utilizing. Labour equipment and capital to convert labour efforts into useful output. Labour productivity is influenced by many factors. Some of the factors are typical to a particular work site, and can be termed as site productivity. Other factor which can be independent of site can be defined as non productive activities. The management of construction manpower begins with the tabulation of labour requirement by trade for each construction project activity. Normally an activity shown in a net work can be further divided into a number of sub activities to facilitate a labour estimate. The labour requirement to complete each

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activities are mainly filed up by estimate made by experienced professional, interviews with foremen on site, site engineers and helpful guilds to estimate the man power requirement of the network is there after arithmetically calculated. As it involves a large amount of computations, some time computers are normally used to estimate the total requirement of man power for a network. The following charts illustrate deferent type of labour productivity output especially for building project.

RESULTS AND DISCUSSION

Labour output productivity

Labour output or labour productivity is a daily accomplishment of a certain quantity of work item(s) in a single or combination of labour forces. The quantity of work is usually expressed in the conventional method of measurement for pieces of activity. A day's work taken as 8 hours working in a period of 24 hours to perform some defined job, there are always involvement of two or more labour types and the engagement of managerial staff, which usually referred to as combination of labour force. E.g. in bricks laying, the main parts are the mason and the helpers. On the top of them all are foremen, the general foreman) and the engineering personnel who usually contribute some fraction to their time in construction, following up and checking process- therefore, the performance contributions of the latter are immense, but the qualification may not be simple. However, in costing, some fraction of their time is usually in the labour force.

Construction labour

Construction industry is a major industry in any country. It employs about the cores of labourers, unskilled or semi-skilled persons. It is a temporary industry. The labour part of any project is usually graded to be the 40% (per-cent) of the total project cost, while the material for such a project takes 60% (per-cent) of the entire project. The workers are usually employed on daily wages it is only on few occasion that they made are permanent. The large construction companies like Julius Berger Nigeria limited, Dantata and sawoe usually engage supervisory staff on regular basis. But they also depend on local labour to carry out the projects execution in different areas. Due to low productivity, the wages being paid by many construction Labours is very low, compared to the labour (both skilled and unskilled) being put into the work force.

Types of construction labour

The practice with many construction industries in Nigeria has shown that construction labour can majorly be divided into:-

Casual labour or daily labour:- the labour employed casually called casual labour, i.e. employed when required. There is no provision of leave except weekly holidays. he payment is usually made for the number of days actually worked for.

Regular establishment labour:- usually supervisory and managing staff is involve in this types of labour. Their service

are required continuously during construction of the project. The payment is usually made monthly. They are also provided leaves and other approved benefits. This type of labour may either be temporal or permanent. Employees have greater security of services and also entitled to much more benefits than temporary types.

Labour requirement

There is no single construction industry that totally excludes the involvement of labour force. Whatever the harsh or supplicated technology and modern equipment that are available for construction activities, there are always labour and labourers behind such available activities in the industry. The labour inputs can be seen as skilled or unskilled. The skilled encompasses all labour inputs in the form of intellect, specialized operations of equipment and trained trades the unskilled one mainly includes the daily labours and helpers. Generally labourers is all about manual and mental efforts that are used to produced output or money.

Current Labour Management

The skilled and unskilled labour forces in Nigerian construction industry need to be followed-up for efficient use of material and the human resources that are always available in a construction site. The control mechanisms and the degree may very depending on the types of contact and their nature, the established working condition and the environment or the belongingness set up for the workers mind within the organization. The contractor's employees at different levels also need a follow-up with actual scientific management on the handling and utilization of capital and other material on the handling and the utilization of the capital and other material resource for the entire contract execution. The lack of incompetent personnel on behalf of the contractor sites, which most of the time is difficult to proof has been accepted as a means of fund meant for the payment of labour work done for some specific tasks.

Labour Productivity Output In Nigeria Projects

Generally, output amount unto identical combination of labour varies from one project to another but the combination may involve some common similar terms like the service of masons, carpenters, iron benders, painters, electricians, plumbers e.t.c. for instance, the work of a mason may involve concrete casting and the machines may be used for the mixing and partial handing and placing of concrete, and the rest activities can be undertaken manually, A typical labour involved in carrying out the construction of a building project from the beginning to the completion of the project is presented below:-

Wages of workers

Wages are the remunerations paid to the workers for the done by them. It may be a contract income fixed between the employers and workers, where workers will sell their labour for money and employers will purchase execution of work. The remuneration paid daily or weekly to the ordinary skilled or unskilled worker is known as wages.

Labour for Building Project

BUILDING CONCRETE FRAME, FINISHES AND ROOFING

ITEM	DESCRIPTION	QTY	UNIT	UNIT RATE(₦)	AMOUNT (₦)
A	BILL NO.1 (MAIN BUILDING FRAME) Substructure (Foundation & Basement)	75	M ³	300	22,500
B	Excavate for strip footings and column Bases starting at Reduced level and not exceeding 1.50m deep	65	M ³	220	14,300
C	Earth backfilling around foundations, well rammed and consolidated	15	M ³	100	1,500
D	Remove surplus spoil from Excavation to storage point.	235	M ³	110	25,850
E	Leveling and compacting bottoms of excavations to receive concrete	235	M ³	115	27,025
F	“Deieldrex” anti-termite treatment to surface of excavation. Placement of single layer water-proofing membrane of Ground Slab (150mm lap) Concrete Work in Foundation plain in-situ Concrete Concrete (1:10)	235	M ³	150	35,250
A	50mm Blinding	3	M ³	12,000	36,000

ITEM	DESCRIPTION	QTY	UNIT	UNIT RATE(₦)	AMOUNT (₦)
	PARTITION WALL (perimeter)				
	Block work				
	Hollow sand Crete block wall in Cement and sand91:6)mortar				
A	225mm wall	830	M ²	1,200	996,000
	Rendering				
B	Tyrolene	1660	M ²	100	166,000
C	Plastering	1660	M ²	500	830,000
	Concrete work				
	Vibrated reinforced in-situ concrete (1:2:4-19mm aggregate)filled into formwork and packed around reinforcement				
A	In lintel	3	M ³	12,000	36,000
	Reinforcement				
	High tensile bar reinforcement in concrete generally				
A	12 mm Diameter bar	150	Kg	180	27,000
	Formwork				
	Sawn formwork				
A	Sides and soffit of lintel FRAMES(GROUND FLOOR)CARRIED TO SUMMARY	60	M ²	500	30,000
					3,683.800

ITEM	DESCRIPTION	QTY	UNIT	UNIT RATE(₦)	AMOUNT (₦)
	FRAMES (GROUND FLOOR)				
	Vibrated reinforced in-situ concrete(1:2:4-19mm aggregate)filled Into formwork and packed around reinforcement				
A	Columns	5	M ³	12,000	60,000
B	Beams	11	M ³	12,000	132,000
C	Slabs	20	M ³	12,000	240,000
	Reinforcement				
	High Tensile bar reinforcement in concrete generally				
	25mm-6mm Diameter bar (for item above)				
B	Columns	640	Kg	180	115,200
C	Beans	1320	Kg	180	237,000
D	Slabs	2000	Kg	180	360,000
	Formwork				
	Sawn formwork				
A	Vertical sides of columns	90	M ²	1,200	108,000
B	Side and soffit of beans	120	M ²	1,200	144,000
C	Soffit of slab	145	M ²	1,200	174,000
D	Edges of slab	70	M	400	28,000

ITEM	DESCRIPTION	QTY	UNIT	UNIT RATE(₺)	AMOUNT (₺)
	Mass in-site concrete 1:3:6-38mm Aggregate				
B	In foundation 230mm thick	7	M ³	12,000	312,000
	Re-enforced in site concrete(1:2:4-19mm aggregate)				
C	Column bases	26	M ³	12,000	312,000
D	Column starters in foundation	2	M ³	12,000	24,000
E	150mm concrete bed	15	M ³	12,000	180,000
	Reinforcement				
	High tensile bar reinforced in concrete generally				
	Cutting, tying and putting in place 25mm-6mm Diameter bar.(for the item above)				
	Column bases				
A	Column starters in foundation	1600	Kg	180	288,000
B	Formwork	200	Kg	180	36,000
	Sawn formwork				
	Vertical sides of columns				
	Edges of bed; 150mm wide				48,000
	BLOCKWALL IN FOUNDATION				25,600
	Hollow sand Crete block wall filled soil with weak concrete				
	255mm wall in foundation				
A	Concrete work	100	M ³	1,900	190,000
	Vibrated reinforced in-situ (1:2:-19mm aggregate				
A	In foundation block wall		M ³	4,000	92,000
	SUBSTRUCTURE (FOUNDATION) CARRIED TO SUMMARY				1,442,025

BULDING CONCRETE FRAME, FINISHES AND ROOFING

ITEM	DESCRIPTION	QTY	UNIT	UNIT RATE(₺)	AMOUNT (₺)
	FRAMES (FIRST FLOOR)				
	Vibrated reinforce in-situ concrete (1:2:4:-19mm aggregate) filled into formwork and packed around reinforcement				
A	Columns	5	M ³	12,000	60,000
B	Roof Beams	9	M ³	12,000	108,000
C	Fascia Beam	3	M ³	12,000	36,000
	Reinforcement				
	High Tensile bar				
	Reinforcement in concrete generally				
A	Columns	640	Kg	180	115,200
B	Roof Beams	1000	Kg	180	180,000
C	Fascia beam	30	Kg	180	54,000
	Formwork				
	Sawn formwork				
A	vertical sides of columns	90	M ²	500	45,000
B	side and soffit of Roof Beams	120	M ²	500	60,000
C	side and soffit of Fascia beam	30	M ²	500	15,000
	PARTITION WALL (Gallery)				
	Block work				
	Hollow sandcrete Block wall in cement and(1:6) mortar				
A	225mmwall	50	M ²	1,900	95,000
	Rendering:				
B	Tyrolene	100	M ²	100	10,000
C	Plastering	100	M ²	500	50,000
	FRAMES (FIRST FLOOR) CARRIED TO SUMMARY				828,200

BULDING CONCRETE FRAME, FINISHES AND ROOFING

ITEM	DESCRIPTION	QTY	UNIT	UNIT RATE(₺)	AMOUNT (₺)
	ROOF (Entrance porch)				
	Concrete worker				
	Vibrated reinforced in-situ				
	Concrete (aggregate filled int				
	Formwork and packed around				
	Reinforcement				
A	In slab	1	M ³	12,000	10,560
B	In down stand beam	1	M ³	12,000	6,000
C	Copping to parapet wall	0	M ³	12,000	3,600
	Reinforcement				
	High tensile bar				
	Reinforcement in concrete				
	General				
A	12mm Diameter bar	70	Kg	180	12,600
B	In slab	40	Kg	180	7,200
C	In Downstand beam	5	Kg	180	900
	Copping to parapet wall				
	Formwork				
	Sawn formwork				
A	In slab	6	M ³	12,000	7,200
B	in Down stand beam	11	M ³	12,000	13,200
C	copping to parapet wall	3	M ³	12,000	3,600

BULDING CONCRETE FRAME, FINISHES AND ROOFING

ITEM	DESCRIPTION	QTY	UNIT	UNIT RATE(₦)	AMOUNT (₦)
	ROOFING				
	LONG SPAN ROOFING SHEET				
A	0.70mm guage over baked Long span Aluminum covering Of approved colour, 150mm Side lap including all necessary Accessories fixed to hard member	260	M ²	2,100	546,000
	CARPENTARY				
	Treated hardwood Roof Members				
B	75 x 10mm wall plate	78	M	300	23,400
C	50 x 150mm rafters	390	M	400	156,000
D	50 x 150mm tie beam	160	M	300	48,000
E	50 x 75mm purlins	270	M	300	81,000
F	50 x 50mm noggins	660	M	150	99,000
	ROOF (PARAPET WELLO CARRIED TO SUMMARY				1,018,260

BULDING CONCRETE FRAME, FINISHES AND ROOFING

ITEM	DESCRIPTION	QTY	UNIT	UNIT RATE(₦)	AMOUNT (₦)
	FINISHER (FLOOR AND) CEILING				
A	FLOOR FINISHER (POLISHED TERRAZO)				
1	Polished Terrazo Floor On Screeded 00 Bed (Measured Separately)	253	M ²	400	101,200
	CEILING FINISHES				
B	600mmx 600mm Acoustic Suspended Ceiling Gypsum Board Complete With And Accessories	200	M ²	2,500	500,000
1	PAINTING				
A	Prepare Surfaces, Apply One Coat Primer And Two Coats Berger Or Equal And Approved Emulsion Paint On Rendered Surface Of 225mm Hollow Block Walling	1,800	M ²	650	1,170,000
1	Fixtures	1	ITEM	300,000	300,000
1	Mounting, Plumbing And Fixing Of Steel Spiral Staircase				
	FINISHES (WALL, FLOOR, CEILING & FIXTURES)				2,071,200

BUILDING CONCRETE FRAME, FINISHES AND ROOFING

ITEM	DESCRIPTION	QTY	UNIT	UNIT RATE(₦)	AMOUNT (₦)
1	SUBSTRUCTURE (FOUNDATION)				1,442,025
2	SUPER-STRUCTURE (GROUND FLOOR)				3,683,800
3	SUPER-STRUCTURE (FIRST FLOOR) ROOF: (parapet wall)				828,200
4	Allow provisional sum of N500,000 for mechanical and electrical services installation during construction				1,018,260
5	FINISHES (WALL, FLOOR, CEILING AND FIXTURES)				500,000
7	GRAND TOTAL				2,071,200
					9,543,485

When work is performed by the laborers, the remuneration is always rewarded to them in one form or the other such wages are also classify as:-

Nominal or money wages:- this is the wages paid to the workers in the form of money for the work done, which is known as nominal or money wages as every workers to be employed will first talk about the money wages he would get per-day or per piece or work done.

Real wages:- this is the wages given in the form of luxuries and comforts which are necessary to improve the standard living of the workers. This is known as real wages. Experience in the past with many construction industries in Nigeria proved that payment of wages, arrears, leaves bonus, and other approved financial benefits were abused by some big construction companies workers were treated beyond measure, and that led to court case between such construction companies and the workers. The end result of the case made many skilled and unskilled workers to be jobless.

Challenges facing labour productivity out-put in Nigeria construction companies

The challenges facing labour productivity out-put in Nigeria construction industry are numerous. A few of the challenges are listed below:-

1. Inadequate training for skill and unskilled labour
2. Improper planning and control by construction managers
3. Lack of motivation for labour producers
4. poor welfare management for labour workers
5. Unavailable materials for work in different companies
6. Mis-management of funds meant for labour.
7. Poor leadership for the labour on sites
8. poor communication the management and the labour producer.
9. Inadequate transportation facilities for workers during workers during working hours.
10. Inadequate medical facilities on construction project sites
11. Poor service facilities, i.e. hotels, cafeteria, canteens, e.t.c being provided during working hours for labour.
12. Geographical location in different parts of the country.
13. Gender and age factors which can either increase or decrease labour output when maximum production is expected especially in big construction companies.
14. Seasonal periods (Really or dry seasons) within the years.
15. Unemployment situation in Nigeria which as made many skilled labour not to be relevant in their trained trades.
16. Attitudes of foreigners in Nigeria construction companies. The influx of many foreigners into Nigeria is not only known as dumping ground, but also taken over some skilled labour work that would have been occupied by Nigerian skilled labour.
17. Security factor which has led to the closure of many industries and construction companies in the northern part of Nigeria.

Recommendation

Having seen the importance of Labour productivity out-put in Nigeria construction industry, it is very imperative for

construction industry in Nigeria to rise up to the challenges facing the industry in every facets. Since the construction industry is a vehicle for driving the country's Economic towards National Stability, an understanding to co-operate with other existing agencies would help to solve major challenges facing the Industry. This can be done through the following:-

- (i). Setting up Standards for Labour skilled workers that would benefits them.
- (ii). Providing training opportunities for the unskilled labour workers as the occasion may demand.
- (iii). Increasing the wages of skilled workers according to their output performance.
- (iv). Government awareness on the need to partner with construction industry in order to receive full support on their activities.

Conclusion

The current conditions of the Nigeria construction labour force in most cases are not commendable, and it lack due recognition and appreciation by all construction parties. Although there are law on labour standards (labour proclamation), they not correctly understood and applied when they reach the construction sites. Therefore, a better working environment and the image of the employers in the construction industries, safety precaution, labour welfare facility, age matters; etc needs proper consideration construction companies in Nigeria needs to open their labour doors to better administration, better working conditions for employees, which should lead to better quality of work with peaceful construction environment. Labour production output as a major factor that influence performance rate need to be understood by all skilled and unskilled labour producer; which should yield a maximum daily measurement at the end of each day's work. A combination of all the force outline under labour standards is a target towards national development and stability, which Nigeria is designed for and pursuing presently. Therefore, all construction industries and parties are enjoyed to follow the labour productivity standards for the full realization of the economic boom and stability of the country.

REFERENCES

- [1] Tessema, M. 2014. The human element at construction sites, a publication of Ethiopian association of civil engineer, Vo l 6, no 1, pg 42- 44
- [2] Gana, A.J. 2010. Civil engineering construction management and economic pgs 33-43, 57-59
- [3] Chitkara, K.K. 2003. Construction project management (planning, scheduling and controlling) pg 420-426) published by Tate McGraw-Hill publishing company Limited, New Delhi, India.
- [4] Gurcharan Singh, 2005. Building Construction and Materials, Published by Rajinder Kumar Jain New Delhi, India, pgs 819-200
- [5] S.V. Deodhar, 2006. Construction Equipment and job planning – Published by Khanna publishers, nath matket, Nai Sarak, Delhi, India, pgs 9-12